

NATIONAL ENERGY TECHNOLOGY LABORATORY



U.S. DEPARTMENT OF  
**ENERGY**

# 2014

## Annual Site Environmental Report



# **2014 Annual Site Environmental Report**

*September 9, 2015*

U.S. Department of Energy

National Energy Technology Laboratory

Albany, Oregon

Anchorage, Alaska

Morgantown, West Virginia

Pittsburgh, Pennsylvania

Sugar Land, Texas

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# 2014 NETL ANNUAL SITE ENVIRONMENTAL REPORT

## EXECUTIVE SUMMARY

The National Energy Technology Laboratory (NETL) assembles and distributes the Annual Site Environment Report (ASER) to provide the public with a comprehensive status of NETL's environmental compliance in five states. This report verifies and documents NETL's mission to advance energy options to fuel our economy, strengthen our security, and improve our environment.

The laboratory implements a wide range of energy and environmental research and development (R&D) programs that enable domestic coal, natural gas, and oil to economically power our nation's homes, industries, businesses, and transportation sources. To meet this goal, NETL applies its expertise to coal, natural gas, and oil technologies; contract and project management; analyses of energy systems; and international energy issues. In addition to research conducted on site, professional support includes R&D conducted through partnerships, cooperative research and development agreements, financial assistance, and contractual arrangements with universities and the private sector. These efforts focus a wealth of scientific and engineering skills on creating commercially viable solutions to national energy and environmental problems.

NETL continued its accomplishments in its Environmental, Safety, and Health (ES&H) programs throughout 2014 in the Albany, Anchorage, Morgantown, Pittsburgh, and Sugar Land sites. NETL has also continued to maintain its ISO 14001:2004 and OHSAS 18001:2007 certifications. Surveillance audits were conducted March 19-20, 2014, at the Morgantown and Pittsburgh sites, July 15, 2014, at the Albany site, and November 18-19, 2014, at the Morgantown and Pittsburgh site. These audits demonstrated NETL's commitment to continual improvement and conformance to Environment, Safety, and Health Management System. NETL continues to demonstrate to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental stewardship.

Likewise, NETL's environmental operating experience and performance measure programs exist as part of its ES&H Management System. Integral are the Safety Analysis and Review System programs which focus on research and development activities, support operations activities, construction permits, and facility use. NETL tracks its performance measures through individual programs, such as groundwater and air quality, but also through its ES&HMS objectives and targets. In general, achieves over 85-90 percent of its performance metrics.

Other achievements include NETL-developed technologies and strategies. Research efforts by NETL and its partners resulted in the issuance of 18 U.S. patents, and two licenses in 2014. In addition, NETL researchers were recognized by STEM (Science, Technology, Engineering, and Mathematics) Outreach Award, an American Institute of Chemical Engineers Fellow; an American Society of Materials International Engineering materials Achievement Award; Federal Laboratory Consortium Far West and Mid-Atlantic Region Awards; and the National Association of Government Communicators Blue Pencil and Gold Screen Awards.

More information on each of the areas covered above, as well as details on other NETL ES&H programs, can be found in this document. This report should address any questions the public may have about NETL's efforts to protect the environment at its five locations. However, other comments and concerns are always welcome and should be addressed, in writing to David Hyman, U.S. Department of Energy – NETL, M/S 58-247A, 626 Cochran's Mill Road, P.O. Box 10940, Pittsburgh, PA 15236; or by e-mail to [David.Hyman@netl.doe.gov](mailto:David.Hyman@netl.doe.gov).

## INTRODUCTION

### 1.1 General Information

As part of the U.S. Department of Energy's (DOE's) national laboratory system, the National Energy Technology Laboratory (NETL) supports DOE mission's to advance the national, economic, and energy security of the United States. NETL is the Department's only national laboratory devoted to fossil energy research.

NETL has national and international expertise in coal, natural gas, and oil technology research; contracting and project management of fossil energy research; systems analysis of energy conversion technologies; and energy supply and production issues. In addition to research conducted on site, NETL's project portfolio includes research and development (R&D) conducted through partnerships, cooperative research and development agreements, financial assistance agreements, and contractual agreements with universities and the private sector. Together, these efforts focus a wealth of scientific and engineering talent on creating commercially viable solutions to energy and environmental problems.

NETL has laboratory sites in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania; and program office sites in Anchorage, Alaska; and Sugar Land, Texas. In total, these sites include 81 buildings and 14 major research facilities, covering nearly 200 acres. As of December 2014, 1,381 employees were employed at NETL's five sites; 557 are federal employees and 824 are site-support contractors.

#### **NETL is organized into seven strategic units:**

The **Office of the Director** (DO) provides guidance and oversight for all functions and authorities delegated to NETL for its programs, administration, legal, public affairs, and procurement activities. In addition, the DO is responsible for the institutional management and administration of the Laboratory in its mission to conduct and implement a research, development, and demonstration (RD&D) program that benefits the public by ensuring the availability of clean, affordable, and reliable domestic energy that protects the environment, fuels economic prosperity, and strengthens energy security.

The **Office of Chief Counsel** (OCC) provides a range of legal services required to support the programs, projects, and functions assigned to the Laboratory and affiliated offices. Scope of services includes interpreting state and federal statutory and regulatory requirements; writing work for others agreements and procurement, and grant and cooperative agreement language; addressing intellectual property issues; and processing requests for information submitted pursuant to the Privacy Act and the Freedom of Information Act. The office has responsibility for implementing ethics and conflict of interest policies and regulations. OCC provides legal advice and guidance on matters pertaining to authorization and appropriation laws, cost accounting standards, cost and pricing policies, cost principles, and compliance with the National Environmental Policy Act (NEPA). The office prepares contractual instruments, reviews prime contract terms and conditions for legal sufficiency, evaluates clauses, and interprets legislative and regulatory language and executive branch policy directives. OCC represents the Laboratory

and takes appropriate legal action to protect the interests of the Laboratory and the Department in litigation and administrative proceedings. The office also manages the process of obtaining patents on inventions made by Laboratory employees and performs the licensing of those patents for commercial use.

The **Strategic Center for Natural Gas and Oil (SCNGO)** works to increase domestic oil and natural gas production, ensure the reliability of the natural gas delivery system, and produce a cleaner environment. This is accomplished by implementing RD&D programs in oil and gas supply. The SCNGO invests in programs and projects that require a federal presence to achieve national energy goals and that can produce clear and tangible public benefits. The center supports policy development by conducting studies on oil and gas supply issues and related environmental systems. The SCNGO also encompasses the Arctic Energy Office and the oil and gas projects the office oversees. The SCNGO approves on-site research topics and provides technical data and analytical tools for sound, rational gas and oil policy development, including environmental issues, reliability modeling for gas and oil exploration and production, delivery systems, access issues, and economic and market trends.

As the principal laboratory implementing coal research, NETL's **Strategic Center for Coal (SCC)** contributes to our nation's pursuit of a secure energy future by developing technology options to enable America to continue to benefit from using its secure, abundant, and affordable coal resources. The Center is part of the Clean Coal Research Program, which supports RD&D activities aimed at improving the performance and reducing the cost of today's coal-based Carbon Capture, Utilization, and Storage (CCUS) systems. The center shapes, funds, and manages the demonstration of first generation CCS/CCUS technologies with existing and new power plants and industrial facilities using a range of capture alternatives and storing CO<sub>2</sub> in a variety of geologic formations. In parallel, to drive down the cost of implementing CCS/CCUS as a potential climate change mitigation strategy, the SCC supports research and development aimed at investigating a range of advances in combustion, gasification, turbines, fuels, and fuel cell technology capable of increasing base power plant efficiency, improving plant economics, and reducing the amount of CO<sub>2</sub> that must be captured and stored per unit of electricity generated.

The **Office of Energy Project Management (EPM)** provides technical, administrative, and project management services on non-fossil energy research to a variety of customers, primarily within DOE and other federal agencies, on a full-cost recovery basis as part of NETL's work-for-others initiatives. Any support this office provides is consistent with and/or complements the Office of Fossil Energy (FE) and DOE missions. This office primarily implements DOE Office of Electricity Delivery and Energy Reliability (OE) and Office of Energy Efficiency & Renewable Energy (EERE) activities that are assigned to NETL.

The **Office of Research and Development (ORD)** performs basic and applied research and development in fossil energy and environmental science. Building on historic Laboratory strengths and competencies, ORD focuses on four research topics recognized as important issues for the 21<sup>st</sup> century:

- *Energy system dynamics* focuses on natural gas technology development, including higher efficiencies and lower costs in the use of advanced gas turbines and fuel cells.
- *Geological and environmental systems* focuses on the minimization and abatement of environmental problems associated with the development and use of fossil fuels. Research topics include geological sequestration of CO<sub>2</sub>, oil and gas exploration and production, air pollution/particulate matter issues, and removal of toxins from emissions from coal utilization systems.
- *Computational and basic sciences* develops tools that enable more rapid and efficient scale-up of new sub-systems, devices and components, to enable more cost-effective demonstration of new technologies.
- *Materials Science and Engineering* specializes in life cycle research of most metals, alloys, and ceramics; and the recycling and remediation of waste streams associated with these processes.

The **Office of Institutional Operations (OIO)** performs and coordinates administrative, operational, construction, and staff support activities for the Laboratory. These include organization and human resource management; information technology management, maintenance, and implementation; on-site ES&H program execution, compliance, and remediation activities; site management, including design, construction, operation, and maintenance of NETL facilities; internal control programs; security services; and real and personal property management.

The **Office of Finance, Acquisition, and Assistance/Chief Financial Officer (OBO/CFO)** plans, directs, and coordinates the Laboratory's CFO and acquisition and assistance functions. OBO/CFO develops and implements the Laboratory's financial policies; performs budgetary planning, financial analyses, financial management and administration services; performs acquisition and assistance services; plans, directs, and coordinates site support contract management and project management compliance activities that crosscut the Laboratory's operating units; develops the Laboratory's comprehensive risk management strategy, implements its comprehensive risk management program, and ensures the compliance of all operational, regulatory and financial functions performed across the Laboratory that are required in the execution of its risk management program; manages the NETL performance measurement system; and conducts compliance reviews.

## 1.2 Focused Standards List

NETL is committed to ensuring compliance with all of the environmental requirements impacting the Albany, Anchorage, Morgantown, Pittsburgh, and Sugar Land locations. Compliance with the numerous requirements found in departmental directives; Executive Orders (E.O.s); federal, state, and local codes; federal, state, and local regulations; acquisition letters; negotiated agreements; and consensus standards is extremely challenging. To ensure compliance requirements are met, NETL established a list of requirements specific to its operations. This list, NETL's *Focused Standards List*, <http://myportal/eDocs/Directives/Documents/focused.pdf> embodies all requirements that apply to NETL operations.

The *Focused Standards List* was established by NETL ES&H subject matter experts who oversee approximately 75 specific ES&H Programs ([Table 1.2.1](#)). Standards and requirements, which the subject matter experts determine to be applicable to NETL's ES&H activities, are incorporated into one or more NETL directives. These directives provide the policies, programs, and procedures used to implement those standards and requirements. The 134 directives include 15 orders, 22 operating plans, and 97 procedures. All standards or requirements on the *Focused Standards List* are implemented through one or more NETL directives.

The *Focused Standards List* includes the citation for both the standard or requirement and the location where the standard or requirement may be found. On a quarterly basis, the location published for the standard or requirement is checked to ensure that it is still available at that location, and because most of the requirements in the *Focused Standards List* are accessible via the Internet, the check verifies that the Internet link is still active. Most of the standards are copyrighted and the vast majority of those standards are provided through electronic subscriptions managed by the NETL library and available on the intranet to all employees. The few standards which are not available through electronic subscription are purchased and placed in the libraries in Morgantown, Pittsburgh, and Albany. In addition, approximately every two years, the subject matter expert for each NETL ES&H directive reviews the directive and updates it, as appropriate.

Implementation of the standards and requirements listed on the *Focused Standards List* is verified through the following approach:

- NETL utilizes a rigorous Safety Analysis and Review System (SARS) to review the details of a project before authorizing any significant activities to proceed. Checklists have been developed for SARS to facilitate verification of the standards and requirements to be covered during the review. ES&H subject matter experts provide support to the SARS process and ensure that applicable ES&H standards and requirements are addressed.
- NETL performs regular walk-through inspections of site facilities, targeting specific facilities each month; this ensures that all NETL facilities are inspected on an annual basis. These walk-through inspections are performed by various ES&H subject matter experts who visually verify that NETL is in compliance with standards and requirements.
- Preparation of this ASER requires a complete review of compliance with all major standards and requirements. Numerous subject matter experts participate in this effort, reviewing the past year's performance to ensure compliance with e ES&H standards, requirements on the Focused Standards List, and as part of the ISO 14001:2004/OHSAS18001:2007 surveillance and certification audits.

### **1.3 Discussion of Sites Within the Document**

NETL comprises three research sites and two field office sites. Each of the sites is located in a different state, is subject to different state and local laws, and focuses on different activities. This document includes detailed discussions for each of the sites. The Albany, Morgantown, and

Pittsburgh sites include laboratories, with a broad array of environmental concerns, and as a result, a detailed discussion is provided for each of these sites in this report. The Sugar Land and Anchorage field office sites perform only administrative functions, and therefore, their environmental impacts and regulatory compliance issues are discussed in less detail.

## **1.4 Accomplishments**

### **NETL Garners Award for STEM Outreach Activities in 2014**

The Federal Laboratory Consortium (FLC) awarded NETL's Dr. Kirk Gerdes and Ms. Lilas Soukup with a 2014 FLC Mid-Atlantic STEM Award for their outstanding efforts to engage America's youth in the disciplines of science, technology, engineering, and mathematics.

Since 2012, Dr. Gerdes has coordinated West Virginia Regional Science Bowl (WVSB), in which students contend in teams to answer STEM-focused questions. In 2014, Dr. Gerdes coordinated a partnership with West Virginia University that expanded the physical size of the WVSB venue, allowing the competition to include more high school teams and add 16 middle school teams. This partnership helps ensure the competition is accessible to all West Virginia high schools and strengthens NETL's STEM education outreach efforts.

Ms. Soukup leads NETL's K–12 educational outreach efforts, including teacher seminars, workshops, and hands-on training, which provide educators with resources to improve their skills in STEM fields. The award also recognizes Ms. Soukup's success in promoting science education directly to K–12 students. Ms. Soukup organizes Science Lab Days, Triple "E" Seminars (Energy, Environment, and Economics), and an annual Earth Day poster competition, and she has coordinated the Southwestern Pennsylvania Regional Science Bowl since 1991.

### **2014 Patents**

- Plasmonic Transparent Conducting Metal Oxide Nanoparticles and Nanoparticle Films for Optical Sensing Applications, Paul Ohodnicki, Jr. (DOE/NETL); Mark A. Andio (ORAU/ORISE); Congjun Wang (URS); 8,638,440, issued January 28, 2014.
- Layered Solid Sorbents for Carbon Dioxide Capture, George A. Richards, Henry W. Pennline, Daniel J. Fauth, McMahan L. Gray (DOE/NETL); Bingyun Li, Bingbing Jiang (West Virginia University); 8,658,561, issued February 25, 2014.
- Gas Sensing System Employing Raman Scattering, Steven D. Woodruff (DOE/NETL); Joel Faulk, Peng Kevin Chen, Michael Paul Buric (University of Pittsburgh); 8,674,306, issued March 18, 2014.
- Basic Refractory and Slag Management for Petcoke Carbon Feedstock in Gasifiers, Kyei-Sing Kwong, James P. Bennett (DOE/NETL); Jinichiro Nakano (URS); 8,703,021, issued April 22, 2014.

- Nanocomposite Thin Films for Optical Gas Sensing, Thomas Brown, Paul Ohodnicki, Jr. (DOE/NETL); 8,741,657, issued June 3, 2014.
- Apparatus and Process for the Separation of Gases Using Supersonic Expansion and Oblique Wave Compression, John G. VanOsdol (DOE/NETL); 8,771,401, issued July 8, 2014.
- A Method and Device for Remotely Monitoring an Area Using a Low Peak Power Optical Pump, Steven D. Woodruff, Dustin McIntyre (DOE/NETL); Jinesh Jain (URS); 8,786,840, issued July 22, 2014.
- Solid Oxide Fuel Cells Having Porous Cathodes Infiltrated with Oxygen-Reducing Catalysts, Wayne Surdoval (DOE/NETL); Meilin Liu, Mingfei Liu, Lifang Nie (GTECH); Ze Liu; David Mebane (ORISE); Lane C. Wilson (DOE/HQ); 8,802,316, issued August 12, 2014.
- Regenerable MgO Promoted Metal Oxide Oxygen Carriers for Chemical Looping Combustion, Ranjani V. Siriwardane (DOE/NETL); Duane D. Miller (URS); 8,807,988, issued August 19, 2014.
- Constant Pressure High Throughput Membrane Permeation Testing System, David Luebke, David Hopkinson (DOE/NETL); Erik Albenze (URS); 8,821,614, issued September 2, 2014.
- Electrically Conducting Metal Oxide Nanoparticles and Films for Optical Sensing Applications, Paul Ohodnicki, Jr. (DOE/NETL); Mark A. Andio (ORAU/ORISE); Congjun Wang (URS); 8,836,945, issued September 16, 2014.
- Regenerable Immobilized Aminosilane Sorbents for Carbon Dioxide Capture Applications, McMahan L. Gray (DOE/NETL); Christopher Jones, Sunho Chai (GTECH); 8,834,822, issued September 16, 2014.
- Layered Solid Sorbents for Carbon Dioxide Capture, Daniel J. Fauth, George A. Richards, Henry W. Pennline, McMahan L. Gray (DOE/NETL); Bingbing Jiang, Bingyun Li (West Virginia University); 8,889,589, issued November 18, 2014.
- Method of CO<sub>2</sub> Removal from a Gaseous Stream at Reduced Temperature, Ranjani V. Siriwardane, George A. Richards, David A. Berry (DOE/NETL); James C. Fisher, II (URS); 8,888,895, issued November 18, 2014.
- Method of Purifying a Gas Stream Using 1,2,3-Triazolium Ionic Liquids, David Luebke (DOE/NETL); Chau Tang, Hunaid Nulwala (ORISE); 8,906,135, issued December 9, 2014.
- 1,2,3-Triazolium Ionic Liquids, David R. Luebke (DOE/NETL); Hunaid Nulwala, Chau Tang (ORISE); 8,907,105, issued December 9, 2014.

- Poly (Hydroxyl Urethane) Compositions and Methods of Making and Using the Same, David R. Luebke (DOE/NETL); Hunaid Nulwala (ORISE); Chau Tang (ORISE); 8,912,303, issued December 16, 2014.
- Production of Methane-Rich Syngas from Hydrocarbon Fuels Using Multifunctional Catalyst/Capture Agent, David A. Berry, Dushyant Shekhawat, Wayne Surdoval, Nicholas Siefert (DOE/NETL); 8,920,526, issued December 30, 2014.

## 2014 Licenses

- Santa Catarina Philanthropic Association/Brazil Coal Association, license for Carbon Capture Simulation Initiative (CCSI) Moving Bed Process Model to Develop Carbon Capture Technology, issued July 24, 2014.
- Issued to Michael Berry, non-exclusive license for U.S. Patent 7,553,517, Method of Applying a Cerium Diffusion Coating to a Metallic Alloy.

## 2014 Awards and Special Recognitions

American Institute of Chemical Engineers (AIChE)—a nonprofit organization providing leadership to the chemical engineering profession representing 45,000 members from over 100 countries in industry, academia, and government.

- Isaac Gamwo was elected as an AIChE Fellow. The honor is bestowed to AIChE chemical engineers in recognition of long-term “service to the profession” and “significant professional accomplishment.”

ASM International—the world's largest association of metals-centric materials scientists and engineers with more than 30,000 members worldwide.

- Jeffrey Hawk, Paul Jablonski, Paul Turner, and Edward Argetsinger were awarded the Engineering Materials Achievement Award by ASM in 2014 for their work in developing the platinum-chromium alloy for coronary stents. The award recognizes outstanding developments in the application of materials in products or in engineering structures and honors the organization or individuals responsible for them.

Federal Laboratory Consortium (FLC)—a nationwide network of federal laboratories that provides the forum to develop strategies and opportunities for linking laboratory mission, technologies, and expertise with the marketplace. Its awards recognize federal laboratories and industry partners for outstanding technology transfer efforts.

- In the FLC Far West Region—

Paul King and Rigel Woodside received the Outstanding Technology Development Award for their work, “Arc Position Sensing Technology.”

Paul Jablonski and Jeffrey Hawk received the Outstanding Technology Development Award for their work, “Superior Heat Resistant Alloys through Controlled Homogenization.”

- In the FLC Mid-Atlantic Region—

Stephen Zitney received the Excellence in Technology Transfer Award for his work, “3-D Virtual Energy Plant Simulator and Immersive Training System.”

National Association of Government Communicators (NAGC)—a professional network of federal, state, and local government communicators. Its Blue Pencil and Gold Screen Awards recognize government agencies or individuals for significant achievement in communication. NETL won Blue Pencil and Gold Screen Awards for two publications:

- The NETL-RUA brochure, “Engineering the Future of Energy.”
- A nationally distributed article in ECO Magazine, “Ultra-deepwater Research at DOE: Protecting Our Environment through Risk Assessment and Spill Prevention.”

## **ENVIRONMENTAL, SAFETY, AND HEALTH MANAGEMENT SYSTEM**

### **2.1 Introduction to NETL's Environmental, Safety, and Health Management System**

The scope of the Environmental, Safety, and Health Management System (ES&HMS) for the three sites covers on-site operations involving employees at the Albany, Morgantown, and Pittsburgh sites, including on-site research and development (R&D) activities, site operations, and the supporting administrative functions related to these activities and operations. Operations not owned or controlled by NETL are excluded from the ES&HMS, such as the credit unions and childcare facilities.

The underlying framework of the ES&HMS is DOE's Integrated Safety Management (ISM) system, whereby ES&H accountability is integrated into individual decisions and corporate planning processes. ISM, ISO 14001, and OHSAS 18001 all provide for a plan-do-check-act approach to maximize the protection of the public, NETL employees, the environment, and property. The ES&HMS uses the same philosophy to protect the environment, both on site and off site, during the conduct of operations under NETL's control.

The Morgantown and Pittsburgh sites received initial certification to the ISO 14001 standard August 31, 2003. The Morgantown and Pittsburgh sites were recertified as a single entity in 2007 by Orion Registrar, Inc. As a follow up to the recertification audit, five surveillance audits were conducted between 2007 and 2009. The Albany site underwent an ISO 14001 recertification audit by Orion Registrar, Inc., on November 23–24, 2009.

Subsequently, all three sites were recertified to the same scope by Orion Registrar, Inc., in 2010. The Morgantown and Pittsburgh sites underwent an ISO 14001/OHSAS 18001 recertification audit in June 2010, along with an ISO 9001 pre-assessment. The Albany site underwent an ISO 14001 recertification audit, an OHSAS 18001 certification audit, and an ISO 9001 pre-assessment in August 2010. (The Sugar Land and Anchorage sites are not required to have an ES&HMS because these operations are not considered facilities, as defined by E.O. 13148, *Greening the Government through Leadership in Environmental Management*).

To maintain ISO 14001 and OHSAS 18001 certifications, recertification audits were conducted September 5–6, 2013, at the Albany site and September 9–13, 2013, at the Morgantown and Pittsburgh sites. Additionally, surveillance audits were conducted March 19–20, 2014, at the Pittsburgh and Morgantown sites; July 15, 2014, at the Albany site; and November 18–19, 2014, at the Pittsburgh and Morgantown sites. These audits demonstrate NETL's commitment to continual improvement in the ES&HMS and conformance to the ISO 14001:2004 and OHSAS 18001:2007 standards. By maintaining these certifications, NETL demonstrates to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental stewardship.

The ES&HMS ensures consideration of the environmental, safety, and health impacts of day-to-day activities and minimizes these impacts, as much as possible, consistent with the mission of fossil energy R&D. The ES&HMS, as described in NETL Orders 440.1, Safety and Health Program, and 436.1, Environmental Management System, includes a policy statement, top-down

responsibility, personal accountability for work being performed, regulatory awareness, document control, goals, self-assessments, and continual improvement activities.

## 2.2 Environmental, Safety, and Health Policy

NETL strives to reduce injuries to the workforce and to minimize hazards to the public and the environment. NETL requires consideration of potential environmental, safety, and health impacts when planning and executing work at all levels. NETL senior management created an ES&H policy as the basis for its ES&H programs. The original policy was updated and approved by senior management in 2005 to align with the 2004 version of the ISO 14001 standard. It was updated again August 9, 2006, to include the Albany site and to incorporate safety and health considerations.

Management commitment and employee involvement are required to maximize oversight and improve communications. However, responsibility for effective environmental, safety, and health performance rests with line management. Line management must involve workers in the planning and execution of environmental, safety, and health programs and must fully communicate information to site personnel.

NETL uses the acronym “PRISM” to illustrate its policy (see Diagram 2.2). PRISM demonstrates the successful incorporation of ISM into the Environmental Management System (EMS). The PRISM graphic is displayed widely at the sites and is provided to each employee in badge form, as a reminder of the policy. The PRISM logo was updated in 2006 to include safety and health, as well as to support the OHSAS 18001 certification.

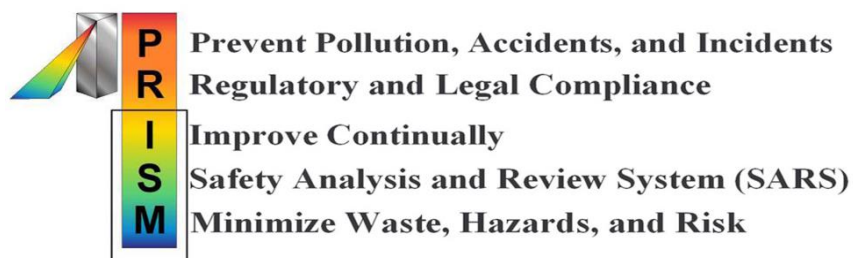


Diagram 2.2: Illustration of NETL's Environmental Policy

## 2.3 Identification of ES&H Significant Aspects

Significant aspects are elements of an organization's activities that can interact with the environment and are under NETL's control or influence. All research projects, operations, and facilities have been inventoried and scored based on their potential for impacting the environment, natural resources, and environmental laws and regulations. The ES&HMS Crosscutting Team—a group composed of the ES&H Management System Representative, the Environmental Branch Lead, the Safety and Health Branch Lead, a representative from the Site Operations Division, a representative from the Crosscutting Research Support Division, and the ES&H management system coordinator—reviews the highest impact scores and determines the list of

most significant aspects. The ES&HMS representative then confirms final approval of NETL's significant aspects.

The 2014 registry (see [Table 2.3.1: Environmental, Safety, and Health Significant Aspects for FY2014](#)) provides a listing of the ES&H significant aspects. No new aspects were added in fiscal year 2014.

## **2.4 Environmental Objectives and Targets**

Following an annual update and ranking of the significant aspects, NETL's environmental, safety, and health objectives and targets are revised and presented to the Management Review Team (MRT) for approval. The MRT is a senior management team that reviews and approves ES&H objectives and targets, reviews ES&H performance, and takes appropriate action when needed to ensure ES&H programs continue to meet ES&H policy. At the MRT meeting held in September 29, 2014, the MRT approved the list of significant aspects (see [Table 2.3.1: Environmental, Safety, and Health Significant Aspects for FY2014](#)), the objectives, and the targets for FY2014.

Objectives are overarching goals for the organization, while targets are specific measurable or quantifiable criteria supporting those objectives. Performance measures are compared to targets to determine the degree of success in reaching associated objectives. Before establishing and reviewing its objectives, NETL considers regulatory and DOE requirements; technological options; financial, operational, and business requirements; and the views of interested parties.

Line managers within the organization assign responsibility for objectives and targets to individuals with expertise in the respective subject areas. These individuals (known as Responsible Persons) develop ES&H management plans (EMPs) specifying how NETL will meet its objectives and targets. The approved objectives and targets, as well as the actual performance data for the FY2014, aspects are presented in [Table 2.4.2: FY2014 Environmental Management Plan Metrics](#) for Albany, Morgantown, and Pittsburgh, and the performance data for the first quarter of FY2015 are presented in [Table 2.4.3](#).

## **2.5 Environmental, Safety, and Health Planning and Analysis Procedures**

NETL takes a tandem approach to planning and managing its activities in an effort to minimize environmental, safety, and health impacts. Some activities require continuous control for the foreseeable future while others can be completed in a single effort. Those activities requiring continuous control are managed through ES&H programs.

**ES&H Directives:** Most activities that can impact the environment are routine and occur repeatedly during ongoing operations. Because these activities are not one-time events, they are best managed through programs documented in directives (orders, operating plans, and procedures). Directives are written to describe how routine actions are undertaken to achieve the safety and environmental goals. Managerial responsibilities are attached to ES&HMS/ES&H function titles. NETL directives establish the foundation and control mechanisms of the ES&HMS. The directives process is described in NETL Procedure 251.1-00.01, Directives and Forms.

**ES&H Management Plans (EMPs):** Some activities that impact the environment can be addressed through a concentrated plan. The specifics of the process and elements of an EMP are explained in NETL Procedure 436.1-03.19, ES&H Significant Aspects, Objectives, and Targets. Each EMP specifies the nature of the action to be taken, the timeframe for the action, the person(s) responsible for the action, quantifiable targets, and measured performance against the targets. Quarterly status reports are collected for each of the EMPs to demonstrate progress.

## 2.6 Implementation and Operational Controls

The ES&HMS is implemented through an organizational structure shown in Diagram 2.6. Senior-level positions include the NETL Director, who serves as the ultimate authority for the ES&HMS; the chief operating officer, who has authority for all on-site operations, including in-house R&D and administrative support and crosscutting functions, and is a lead member on the MRT; the Director of the Office of Institutional Operations, who is the environmental, safety, and health steward and champion; the Director of the Office of Research and Development; the Division Director for ESS&H, who functions as the program administrator and ES&HMS Representative; the Director of the Site Operations Division; and the Director for the Cross-cutting Research Support Division. Mid-level titles and responsibilities are defined in several NETL directives that specify key components of the ES&HMS. The ESS&H Division Director assigns employees to the functional titles and responsibilities.

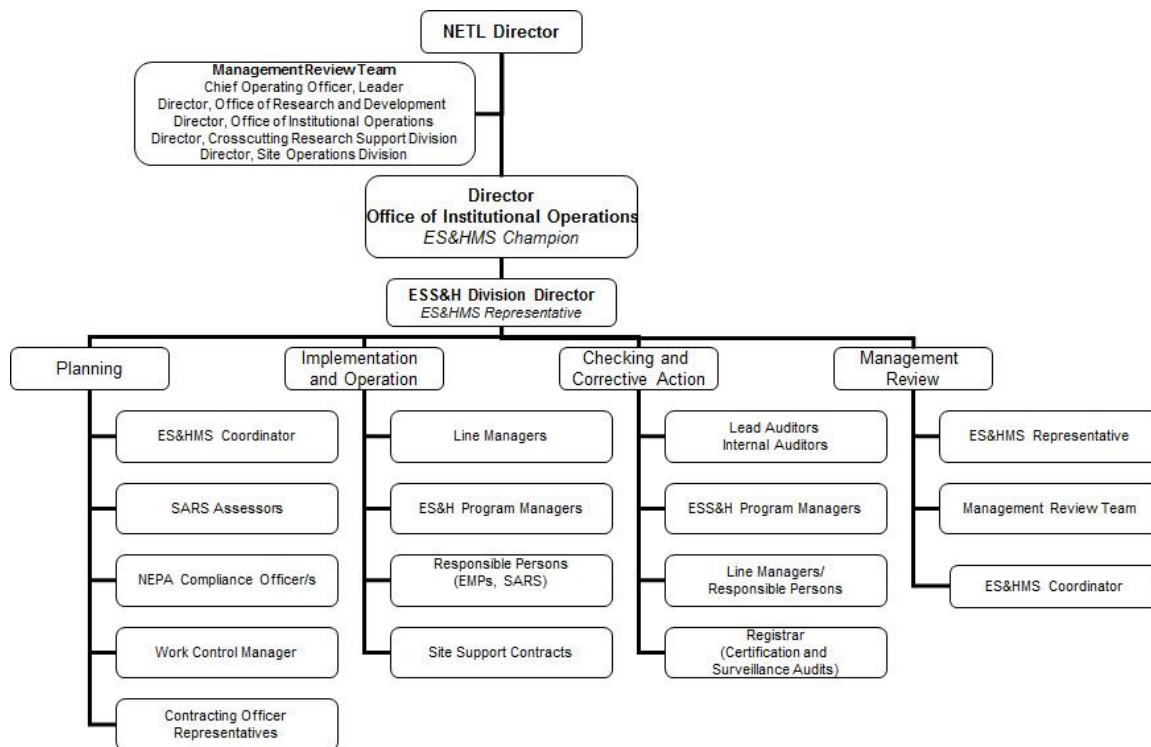


Diagram 2.6: NETL's ES&H Management System Organization

Line managers are the primary means for NETL to achieve operational control within the ES&HMS. Communication also occurs through the NETL intranet, which provides a secure internal website containing current versions of all NETL directives, as well as general reference information, forms, and programmatic information. The ESS&H webpage contains a “roadmap” that provides an overview of available information about the NETL ES&HMS.

Another example of internal communication at NETL is the biweekly regulatory review, which promotes awareness of regulatory changes and new programs. Every two weeks, federal and state agency websites are reviewed to identify changes in environmental laws, regulations, guidance documents, compliance information, and regulatory agency programs. The DOE Headquarters' website is also reviewed to check for new DOE requirements and guidance. These reviews are circulated to the ESS&H staff and posted on the NETL intranet homepage.

NETL also communicates information about the ES&HMS to its employees through the NETL intranet, training, staff meetings, e-mail, and posters. The training program includes general ES&HMS training designed to make employees aware of the ES&HMS by providing them with information about significant environmental, safety, and health aspects and the potential impacts on their work, employee roles, and responsibilities and the potential consequences of not following operating procedures. In addition to the general training, program- and job-specific training is required based on an employee's job duties. The computer-based training system uses a job hazard survey to determine which training modules are necessary. Job-specific training for an employee can also be requested directly by the employee or by his/her supervisor. Each employee and his/her supervisor are responsible for ensuring that all required training is complete before beginning an assignment.

For purposes of communication with external parties, NETL maintains an external webpage ([www.netl.doe.gov](http://www.netl.doe.gov)). The webpage includes a section on Site Environmental Quality that provides the ES&H policy and significant ES&H aspects.

NETL conducts public participation activities under the requirements of the National Environmental Policy Act (NEPA). For projects receiving federal funding, NETL is required by law to use the NEPA process to identify potential environmental impacts, consider alternatives, invite public comment or participation, plan the project with due regard for the environment, impose mitigation requirements, and make informed decisions about whether to proceed with the proposed project. The NEPA process provides a system for reviewing actions prior to a major expenditure of funds to ensure the environmental and social impacts have been identified and analyzed and will be mitigated to the extent practicable prior to committing to the project.

To effectively and efficiently implement the ES&HMS, NETL must maintain operational control of its on-site R&D projects, facilities, and operations. This is accomplished through the Safety Analysis and Review System (SARS) process. This process requires proposed projects to be described in writing and subjected to ES&H and quality reviews by subject matter experts and technical committees. Approval must be granted before a project, operation, or facility can proceed beyond the planning stage. Included within this process is a review of the potential environmental impacts, regulatory requirements, safety and health hazards, and monitoring plans. After a project begins, annual reviews are required to ensure the project remains within

the bounds and constraints that were previously imposed. If the project requires changes, the SARS package must be modified, and the SARS process repeated. Other processes for operational control include the following:

**Environmental Programs:** Programs have been established for both defined media (air, surface water, and ground water), and likely pollution routes (spills, hazardous waste, nonhazardous waste). Each program is described in an operating plan or procedure and is managed by a corresponding ES&H program manager.

**Contract Requirements:** Work performed by contractors is controlled at the NETL sites through contractual provisions and NETL directives that define the ES&H requirements for work on NETL property, as well as for NETL-funded work at off-site locations.

**Affirmative Procurement Program:** A program has been established that requires certain procurements use environmentally preferred products, as outlined in NETL Procedure 541.2-00.01, Affirmative Procurement Program.

**Document Control:** An integral part of operational control is documentation. Critical documents are controlled according to a defined process to ensure they can be located. They are also periodically reviewed and revised. This ensures that the current versions are readily available and obsolete documents are promptly disposed.

Core ES&HMS documentation is embodied primarily within NETL ES&H directives. The most recent and official hard-copy versions of NETL directives reside with the NETL directives coordinator. Electronic versions of these controlled directives are placed on the intranet for employee use and are considered official versions. Official copies of ancillary tables, lists, and forms are also maintained on the intranet and are reviewed and updated as required.

## **2.7 Self-Assessment Procedures and Corrective and Preventive Action**

NETL uses self-assessment procedures to improve ES&H performance through identification of nonconformities and tracking of corrective and preventive actions. Several practices are employed, including internal audits, reviews, and inspections; independent assessments; and reporting through NETL's corrective action tracking system, the Assessment Input Information System (AIIS).

NETL conducts both internal and external audits of its ES&HMS as required by the ISO 14001:2004 and OHSAS 18001:2007 standards. This process is defined in Procedure 450.4-01.02, ES&H Assessments Process. An annual planning schedule is used to ensure both the ISO 14001:2004 and OHSAS 18001:2007 standards are audited against the ES&HMS. Five ES&HMS audits were performed in 2014, including two internal audits and three surveillance audits by the ISO14001/OHSAS 18001 registrar.

Management's commitment to the ES&HMS is evidenced by its role in the ES&HMS, and management review of ES&H assessments. DOE and contractor ES&H specialists participate in regular site audits and inspections, covering all NETL facilities annually. These audits and

inspections focus on observable conditions at the facilities [e.g., compliance with Occupational Safety and Health Administration (OSHA) regulations, National Fire Protection Association codes, the National Electric Code, and other environmental, safety, and health requirements]. Findings are entered into AIIS, and the status of the corrective actions is provided on a monthly basis to the office directors and on a semi-annual basis to the Management Review Team.

Annual Safety Analysis and Review System (SARS) assessments are performed on new or modified R&D projects, construction activities, facilities, and support operations. Annual assessments are performed to ensure continued ES&H compliance of existing projects, construction activities, facilities, and support operations. A full discussion of the SARS process can be found in [Section 3.16](#), Quality Assurance.

The responsible program managers review their areas on a continual basis so that they remain in compliance with both regulatory and NETL requirements (e.g., the Water Quality Program, the Air Quality Program, and the Ground Water Program). These reviews are informal and may vary in scope and detail. Respective program managers attempt to verify that the requirements stated in the procedure remain relevant and are actually being met. When discrepancies are found, program managers decide whether to remove a specific requirement from the directive or to enforce it. Some programmatic reviews occur more frequently or focus on monitoring results. These reviews look for trends, with the goal of identifying correctable problems and promptly taking action.

Site-support contractor employees periodically inspect higher risk items, document their findings, and provide the results to program managers. For example, daily inspections are performed at the hazardous waste facility, at selected potential spill sources, and at storm water outfalls. Weekly inspections are made at industrial wastewater discharge points. Quarterly discharge monitoring reports are compiled and reviewed to determine if permit limits have been exceeded. Semi-annual surface water monitoring reports are compiled and reviewed. All of this information provides program managers an opportunity to assess the effectiveness of their programs.

Meaningful reviews for compliance can occur only if the program managers remain abreast of the changing laws and regulations, and DOE administrative requirements. NETL has several means of maintaining current awareness:

- A biweekly regulatory review covers significant changes in laws and regulations. Information is gathered from websites of selected government agencies and DOE's Office of Health, Safety, and Security (HS-1).
- Program managers receive private sector publications, including "Environmental Compliance in West Virginia," a quarterly regulatory update bulletin published by Business and Legal Reports, Inc.; environmental compliance updates on CD-ROM, published by the Bureau of National Affairs; and various trade journals.

- Program managers draw on the Pennsylvania Bulletin and the Pennsylvania Code, (produced by the Commonwealth of Pennsylvania) and the Code of Federal Regulations (published by the National Archives).
- NETL library subscribes to relevant regulatory documents, including most documents on the Focused Standards List (a list of all applicable legal requirements that NETL adheres to), which are available electronically on the NETL intranet or in the library.
- Program managers purchase updated lists of hazardous or regulated chemicals, as needed.
- Environmental program managers periodically check the websites of regulatory agencies, such as the West Virginia Department of Environmental Protection (WVDEP), the Pennsylvania Department of Environmental Protection (PADEP), and the Oregon Department of Environmental Quality (ODEQ).
- Albany uses a regulatory review service, RegScan<sup>™</sup>, to provide regular review of federal and Oregon state regulatory changes to ensure continued compliance with regulatory requirements.
- Program managers may take training classes on relevant statutes and regulations to develop general awareness of new areas of responsibility.
- Subject matter experts, primarily in the ESS&H Division, ultimately are responsible for keeping NETL informed of changing laws and regulations. Part of the program manager's general job responsibilities is to stay abreast of regulatory issues that may affect the NETL ES&HMS and to take appropriate actions to implement these requirements.

An external contractor conducts Independent Program Assessments: In addition to internal audits, these assessments identify strengths, weaknesses, deficiencies, and opportunities for improvement. They provide a look at regulatory compliance and ensure that non-compliances are identified and corrected. The contractor reviews internally and externally generated documents and interviews program managers and other personnel. The independent assessments cover: (1) directives, policies, standards (including ISO 14001 and OHSAS 18001), permits, and regulations; (2) organization and administration; (3) staffing and training; (4) communication and dissemination of program information; (5) documentation and reporting; and (6) performance measurement. The assessments found these programs were working well and resulted in a few recommendations for improvement.

**Workplace Monitoring Program:** In general, the systems in place for the workplace monitoring program are effective and contribute to the protection of NETL workers and the environment. The system is effective in identifying workplace hazards and screening employees for the potential of exposure to those hazards. Line managers and support staff work cooperatively to reduce or eliminate exposures to employees.

Frequent industrial hygiene monitoring has not been necessary at NETL, because engineering controls reduce personnel exposure to minimal levels. Monitoring of most activities is largely

driven by the SARS process, which establishes routines for safely operating facilities or research projects inclusive of workplace monitoring.

**Construction SARS and Permit Process:** Adherence to this process will ensure NETL construction activities are conducted in a safe and environmentally compliant manner. The final result is an approved construction permit issued prior to construction activities. Initially, the selected contractor will develop and document an ES&H plan. Subsequent activity hazard analyses (AHAs) will be conducted for construction activities not explicitly covered in the contractor ES&H plans. Similarly, potential environmental impacts due to construction are considered and appropriate mitigations are developed in accordance with applicable codes and standards.

**Facility SARS Program:** This procedure establishes the requirements for obtaining a facility use permit. In general, the systems in place for the Facility SARS Program are effective and contribute to the protection of workers and the environment. The facility use SARS focuses on identifying life safety, fire safety, and electrical safety classifications; assessing the compliance of the facility with applicable codes and standards; documenting any deviations of the facility from applicable codes and standards; and developing mitigations to address code deviations and to establish acceptable risk levels for facility utilization when code compliance cannot be achieved in the near term. NETL does an excellent job of training its employees to understand their responsibilities, the regulations applicable to their jobs, and best practices related to structural engineering, mechanical engineering, and construction safety.

**Industrial Wastewater Program:** The systems in place relative to the industrial wastewater program are effective and contribute to the protection of workers and the environment. Employees are trained to ensure that they know their responsibilities, applicable regulations, and best management practices related to chemical hazards, including management and disposal of hazardous materials. Additional training is provided when needed for exceptional circumstances.

**Corrective and Preventive Action Program:**

- Nonconformance with any of the appropriate regulations or standards identified during any of the self-assessment audits (or external assessments/audits) mentioned above would be documented using NETL's current corrective action tracking system, the Assessment Input Information System (AIIS).
- NETL Procedure 450.4-01.04, Corrective and Preventive Action Process, outlines how corrective and preventive action items identified in the various assessments are captured, prioritized, assigned, analyzed for their root cause, tracked, closed, and incorporated, as appropriate, into the lessons learned and training systems. This process holds responsible persons and line management accountable for timely closure of corrective actions within their programs, organizations, or facilities, and disseminates lessons learned across appropriate organizational elements.

- After completion of an assessment, the lead assessor uses the corrective action tracking system (AIIS) to generate an assessment record. When a finding is entered into the system, a unique number is assigned and cataloged in the database with the associated assessment record. A notification of the finding is sent electronically to the responsible person and his line manager. All actions taken regarding the finding are then documented in AIIS. To ensure findings have been fully addressed, follow up is done through the internal auditing process. Each month, a number of closed findings undergo verification audits to determine if the corrective actions taken address the closed findings appropriately.
- Other processes used for reporting corrective actions include: Procedure 151.1-01.02, Emergency Categorizations, Classifications, and Notifications, a procedure used to catalog and investigate major nonconformities related to emergencies, as required by DOE; and Procedure 231.1-00.02, Injury/Illness Investigation and Reporting, which sets forth the minimum requirements for injury or illness and property damage investigation and reporting for NETL.

## **2.8 Quality Assurance**

Please see Section 3.16 for a description of the NETL Quality Assurance (QA) Program, including QA for the ES&HMS.

## **2.9 Management Review Process**

Management review of the ES&HMS ensures the ES&H policy and management system remain appropriate and effective. The ES&HMS representative conducts semi-annual review meetings with the Management Review Team - MRT (see [Diagram 2.6: NETL ES&HMS Organization](#)), to allow the MRT to review current environmental, safety, and health policy; objectives; targets; internal and external audits; and other related issues. Changes are documented and implemented. Management involvement ensures that projects are funded with the appropriate priority. Notes from the MRT meetings are posted to the intranet.

The MRT met on April 15, 2014, and on October 9, 2014. The MRT meeting in April focused on progress towards NETL's FY2014 objectives and targets. The meeting in October focused on ensuring that the aspects, objectives, and targets were appropriate for FY2015.

## COMPLIANCE SUMMARY

### 3.1 Major Environmental Statutes

Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. The environmental statutes NETL considered when evaluating compliance included the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Superfund Amendments and Reauthorization Act (SARA); Resource Conservation and Recovery Act (RCRA); Clean Air Act (CAA); Clean Water Act (CWA); Atomic Energy Act of 1954 (AEA); National Environmental Policy Act (NEPA); and Toxic Substances Control Act (TSCA).

### 3.2 Executive Orders

NETL was in full compliance with all applicable environmental Executive Orders in 2014. Throughout the year, numerous inspections and audits were performed and documented to ensure there were no instances of noncompliance. Those executive orders include E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, described more fully in Section 3.6; and E.O. 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. In addition, other executive orders that apply to NETL, but for which no specific actions were required in 2014, include [E.O. 11514](#), *Protection and Enhancement of Environmental Quality*; [E.O. 11738](#), *Providing For Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans*; [E.O. 11987](#), *Exotic Organisms*; [E.O. 12088](#), *Federal Compliance with Pollution Control Standards*; [E.O. 11988](#), *Floodplain Management*; and [E.O. 11990](#), *Protection of Wetlands*; and [E.O. 12898](#), *Environmental Justice for Low Income & Minority Populations*.

### 3.3 DOE Internal Environmental and Radiation Protection Orders

NETL was in full conformance with DOE Order 436.1, Departmental Sustainability, which is the primary internal environmental protection order within the Department. NETL does not operate a radiological program of similar scope to the DOE national laboratories administered under the National Nuclear Security Administration's control. However, due to the fact that there are a limited number of sealed sources at NETL, these sources were administered in full compliance with DOE Order 458.1, Radiation Protection of the Public and the Environment, as discussed below.

### 3.4 Atomic Energy Act of 1954

The Atomic Energy Act of 1954 (AEA) and its amendments require federal control of radiation source materials for the protection of the public and workers. DOE orders, U.S. EPA regulations, and Nuclear Regulatory Commission regulations are based on the AEA. To fulfill its obligations, DOE has implemented radiation protection programs at its facilities that process, produce, handle, use, or dispose of radiation source or other radioactive materials. Radiation exposure at NETL is managed based on the "as low as reasonably achievable" (ALARA) principle.

NETL does not currently have any active radiological research projects, but has projects that use radiation generating devices and use/process naturally-occurring radioactive materials or technologically-enhanced naturally-occurring radioactive materials (NORM/TE-NORM) at all three NETL sites. In addition, radioactive sources are used at both the Morgantown and Pittsburgh sites, and there are historical radioactive materials present at the Albany site. NETL continues to enhance its control of NORM/TE-NORM by updating its R&D SARS requirements to control and limit potential releases of radiological materials. As part of implemented controls, NETL operates its facilities and conducts activities such that radiation exposures to members of the public and the environment are maintained as low as is reasonably achievable (ALARA), within limits established in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. NETL actively surveys facilities, equipment, and materials for proper decontamination or waste management in accordance with DOE requirements, and currently has limited applicability for any potential alternative radiological clearance of materials, as minimal low-level radioactive waste is processed on an infrequent basis.

The radiation safety officer maintains an inventory of these radiation sources, tracking each item, isotope(s), quantity, custodian, location, status, and activity. [Table 3.4.1](#) lists the 2014 source inventory at Morgantown; [Table 3.4.2](#) lists the 2014 source inventory for Pittsburgh.

Table 3.4.1: 2014 Radioactive Source Materials Inventory—Morgantown			
Isotope	Activity/Date Determined	Source	Location
Ni-63	10 mCi (03/01/04)	Analyzer S/N 787AN, cell serial #2103, Molecular Analytics, Inc.	B-3, Room 150
H-3	20 Ci (5/94)	Model #B100/U10, Serial #575263, SRB Technologies	B-33
H-3	20 Ci (5/94)	Model #B100/U10, Serial #574434, SRB Technologies	B-33
H-3	20 Ci (5/94)	Model #B100/U10, Serial #574435, SRB Technologies	B-33
H-3	20 Ci (5/94)	Model #B100/U10, Serial #574436, SRB Technologies	B-33
Cs-137	10 mCi (3/10)	Registration #0190/10, Geotek, Ltd	B-12
Cs-137	1 µCi (1/14)	Serial #206, Spectrum Techniques	B-16

Table 3.4.2: 2014 Radioactive Source Materials Inventory—Pittsburgh			
Isotope	Activity/Date Determined	Source	Location
Depleted Uranium	Obsolete/Excess	Model: 6A Serial #: 75788 Victoreen Industries	B-95
CS137/	37 kBq 1µC	Check Source: CS137S Description: PL Yellow Spectrum Techniques for Ludlum Measurements	B-95
CS137 Exempt quantity: No known radiation hazard			

The Morgantown and Pittsburgh sites did not release any of the radiation source materials into the environment, as all source materials are sealed from escape or discharge. No radiation source materials were sent from the Morgantown and Pittsburgh sites to off-site storage or disposal facilities. The Albany site has legacy radiological issues, which include the presence of ores that are NORM. Radiological waste generated at the Albany site is packaged for proper

waste disposal as low-level radioactive waste (LLRW) in accordance with applicable regulations at the licensed regional facility in the State of Washington (U.S. Ecology), as authorized via an active site-use permit with the State of Washington–Department of Health. No LLRW disposal was required during 2014 associated with operations at the Albany, Morgantown, and Pittsburgh sites.

Radiation exposure monitoring at the Albany, Morgantown, and Pittsburgh sites consisted of the use of personal dosimeter badges. Leak testing of radiation-generating devices is conducted by site support contractors on an annual basis.

### **3.5 National Environmental Policy Act**

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq., 1969) establishes Federal policy for protecting the quality of the environment. The act establishes three levels of review for Federal actions: environmental impact statements (EISs), environmental assessments (EAs), and categorical exclusions (CXs). Under the highest level of review, an EIS is prepared to evaluate the environmental consequences of any major Federal action that might have significant impact on the quality of the human environment. The EIS must include a comparative analysis of those realistically available alternatives that would accomplish the same goals that the Federal action is expected to address. Based on the EIS, a Record of Decision is prepared to document which alternative will be pursued.

If the scope of the Federal action does not clarify that an EIS is necessary, or if the potential for environmental impacts from the proposed action is uncertain, the second level of review, an EA, is prepared. Based on the analysis in the EA, a determination is made that either the potential environmental impacts warrant preparation of an EIS, or the impacts are not significant and a finding of no significant impact (FONSI) can be issued.

If the Federal action does not have a significant effect on the environment, either individually or cumulatively, then the third level of review, a CX, is warranted. These types of Federal actions can be excluded from an in-depth NEPA review. The U.S. Department of Energy (DOE) has determined that certain classes of actions do not individually or cumulatively have a significant effect on the human environment and, therefore, can be covered by a CX. A list of the CXs, as well as the eligibility criteria for their application, is identified in DOE's NEPA implementing procedures (10 CFR 1021).

NETL conducts NEPA reviews for both on-site and off-site actions proposed for funding by the Federal government. These include actions planned in cooperation with other governmental organizations, educational institutions, and private industry.

#### **DOE/EIS-0431: Hydrogen Energy California IGCC Project**

Hydrogen Energy California, LLC, was selected under the Clean Coal Power Initiative (CCPI) Program to demonstrate integrated gasification combined cycle (IGCC) technology with carbon capture in a new base load electric generating plant located in Kern County, California. The IGCC demonstration plant will use blends of coal and petroleum coke (pet coke), or pet coke

alone, as its feedstock and generate approximately 250 MW (net) of electricity. At the end of 2010, the Draft EIS was on hold pending project developments. On September 2, 2011, SCS Energy California, LLC (SCS Energy) acquired 100 percent ownership of Hydrogen Energy California, LLC from BP Alternative Energy North America, Inc., and Rio Tinto Hydrogen Energy, LLC. SCS Energy is a private power plant development company headquartered in Concord, Massachusetts. DOE filed an amended Notice of Intent in the Federal Register on June 19, 2012, which explained new features of the power plant design to include the addition of hydrogen processes that would be used to manufacture several types of nitrogen-based fertilizers. The public scoping meeting for the amended project was held in Tupman, California on July 12, 2012. The public scoping period ended on July 29, 2012. On July 15, 2013, the Draft EIS was sent out for public comment. The Preliminary Site Assessment and Draft EIS Notice of Availability were published in the Federal Register on July 22, 2013. On September 17 and 18, 2013, joint public hearings/workshops were conducted in Buttonwillow, California with the DOE and the California Energy Commission (CEC). The project is currently on hold as a result of recent corporate changes within Occidental Petroleum and their Elk Hills Facility. SCS Energy has been unable to reach a mutually acceptable CO<sub>2</sub> Sequestration/Off-take Agreement for EOR operations. Further, the Cooperative Agreement between DOE and SCS Energy expires January 20, 2015.

#### **DOE/EIS-0444: Texas Clean Energy Project**

Summit Texas Clean Energy, LLC, was selected under CCPI Round 3 to build the Texas Clean Energy Project adjacent to an oil field in Ector County, near Odessa, Texas. The goal of the project is to plan, design, construct, and operate a coal-fueled electric power and chemicals production plant integrated with carbon dioxide (CO<sub>2</sub>) capture and geologic storage. The Record of Decision was published in the Federal Register on September 29, 2011. A Supplement Analysis to assess new information on the revised power plant configuration and new options for supply of process water to the plant was in preparation throughout 2014.

#### **DOE/EIS-0464: Lake Charles CCS Project**

Leucadia Energy, LLC was selected under the Industrial Carbon Capture and Sequestration (ICCS) Program to construct and operate the Lake Charles CCS Project in southern Calcasieu Parish, Louisiana. The proposed CCS project would be part of a larger project, the Lake Charles Cogeneration Gasification Project (LCC Gasification Project, a connected action for NEPA analysis), which would gasify pet coke and convert the syngas to methanol. The CCS project would involve the capture and storage of CO<sub>2</sub> from the gasification plant to be constructed on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana. The CO<sub>2</sub> would be captured, compressed, and transported for use in existing independent CO<sub>2</sub> enhanced oil recovery (EOR) operations. The CO<sub>2</sub> would be compressed and delivered via a new connecting pipeline to the existing Green Pipeline for transport and use in existing EOR operations along the Gulf Coast. Confirmation of permanent storage of a portion of the CO<sub>2</sub> injected as part of existing EOR operations in the Hastings oil field south of Houston, TX, would be obtained through a research monitoring, verification, and accounting program. The Final EIS Notice of Availability was published in the Federal Register on November 22, 2013. The Record of Decision was

published in the Federal Register on January 10, 2014. In October 2014, Leucadia announced that they would no longer pursue the project.

### **DOE/EIS-0460: FutureGen 2.0 Oxy-combustion Large-Scale Test**

Ameren Energy Resources (Ameren) and the FutureGen Alliance were selected by DOE for funding for the FutureGen 2.0 initiative to help position the United States as a leader in innovative technologies for reducing carbon emissions from existing coal-fired plants. As part of this initiative, DOE will provide funding to the Alliance to design, construct, and operate an oxy-combustion power facility that is fully integrated with a carbon capture, transport, and storage system. The Final EIS Notice of Availability was published in the Federal Register on November 1, 2013. The Record of Decision was issued on January 13, 2014.

### **DOE/EIS-0473: W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project**

NRG Energy, Inc. was selected under CCPI Round 3 to design, construct, and operate a commercial-scale CO<sub>2</sub> capture facility at its existing W. A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas; deliver the CO<sub>2</sub> via a new 80 mile pipeline to the existing West Ranch oil field in Jackson County, Texas for use in Enhanced Oil Recovery (EOR) operations; and demonstrate monitoring techniques to verify the permanence of geologic CO<sub>2</sub> storage. The project would use an amine-based post-combustion technology to capture 90 percent of the CO<sub>2</sub> annually from a 250-MWe flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Captured CO<sub>2</sub> would be dried, compressed, and transported via pipeline for use in EOR at the West Ranch oil field where it will ultimately be sequestered. An EIS Determination was signed on July 6, 2011 and a Notice of Intent was published in the Federal Register on November 14, 2011. Public scoping meetings were held in Needville and Edna, Texas with the public scoping period ending on December 14, 2012. The Draft EIS Notice of Availability was published in the Federal Register on September 21, 2012 followed by public hearings in Thompsons and Edna Texas in October. The public comment period ended on November 5, 2012. The Final EIS Notice of Availability was published in the Federal Register on March 8, 2013. The Record of Decision was published in the Federal Register on May 8, 2013 and a Mitigation Action Plan was completed in June 2013. The project broke ground in September 2014; the target completion date is December 2016.

The following EA activities took place in FY2014:

### **DOE/EA-1616A: National Carbon Capture Center Project at Southern Company Services' Power Systems Development Facility near Wilsonville, AL**

The U.S Department of Energy, National Energy Technology Laboratory (DOE NETL) has prepared this second amended Environmental Assessment (EA) to analyze potential environmental impacts associated with both ongoing and future R&D project work at the National Carbon Capture Center (NCCC) located at the existing Power Systems Development Facility (PSDF) located near Wilsonville, AL. The NCCC is designed to test and evaluate carbon dioxide (CO<sub>2</sub>) control technologies for power generation facilities. The NCCC provides

the capability to test power systems under a wide range of fuels, including bituminous and sub-bituminous coals, lignite, and biomass/coal mixtures.

The goal of the NCCC project is to accelerate the development, optimization, and commercialization of viable CO<sub>2</sub> control technologies. DOE previously prepared and issued the initial original PSDF EA and a Finding of No Significant Impact (FONSI) in 1993. The first amended PSDF EA and FONSI of ongoing and future operations was issued in 2008 specifically pertaining to the NCCC. As current technologies are advancing and new technologies are developing at the NCCC, NETL felt the need to proactively and periodically update the present 2008 PSDF/NCCC NEPA EA documentation. Therefore, DOE NETL has prepared this second amended PSDF/NCCC EA to address ongoing and future R&D program/project work activities for the next 5 year period through 2019.

### **DOE/EA-1752: Pacific Gas and Electric Company (PG&E) Compressed Air Energy Storage (CAES) Compression Testing Phase Project, San Joaquin County, CA**

PG&E's Compressed Air Energy Storage Compression Testing Phase Project was selected by DOE's National Energy Technology Laboratory, on behalf of the Office of Electricity Delivery and Energy Reliability's Smart Grid Demonstrations Program, as part of the American Recovery and Reinvestment Act of 2009. DOE provided up to \$25 million in a cooperative agreement with PG&E. The study is co-funded by the federal DOE, California Public Utilities Commission, and the California Energy Commission. The goal of the project is to construct, operate, and then decommission an injection and withdrawal well, compression equipment, and associated temporary site facilities required to conduct pressure testing of a depleted gas field. PG&E proposes testing the gas field to confirm its geologic and engineering suitability for future use as the air storage reservoir for a compressed air energy storage facility. The testing site is located on King Island, San Joaquin County, California. An EA Determination was signed on March 2, 2010. DOE issued the draft EA for comment on November 26, 2013, and advertised its release in *The Record* and the *Lodi News-Sentinel*. The 35-day comment period ended on December 31, 2013. The Finding of No Significant Impact was signed on May 15, 2014, and the final EA was distributed on May 16, 2014.

### **DOE/EA-1976: Emera CNG, LLC, Compressed Natural Gas Project, Port of Palm Beach, FL**

Emera filed its application for export authorization with DOE's Office of Fossil Energy (FE) on November 20, 2013, seeking long-term authorization to export CNG to both free trade and non-free trade countries. This application was granted (for free trade countries) on June 13, 2014, in DOE/FE Order No. 3447. DOE issued a notice of application in the Federal Register on July 3, 2014. Emera's CNG plant would include facilities to receive, dehydrate, and compress gas to fill pressure vessels with an open International Organization for Standardization (ISO) container frame mounted on trailers. Emera plans to truck the trailers a distance of one quarter mile from its proposed CNG facility to a berth at the Port of Palm Beach, where the trailers would be loaded onto a roll-on/roll-off ocean going carrier. Emera plans to receive natural gas at its planned compression facility from the Riviera Lateral, a pipeline owned and operated by Peninsula Pipeline Company. For the initial phase of the project, Emera intends to send these

CNG tank containers from Florida to Freeport, Grand Bahama Island, where the trailers would be unloaded from the ship, and the CNG decompressed and injected into a pipeline for transport to electric generation plants owned and operated by Grand Bahama Power Company. DOE would not be providing funding or financial assistance to this project. DOE would not be providing funding or financial assistance to this project. DOE's proposed action is to grant authorization for the exportation of CNG from the Port of Palm Beach under Section 3 of the Natural Gas Act 15. The Draft EA is scheduled to be available for Public Comment the first quarter of 2015.

**The following Categorical Exclusion (CX) activities took place in FY2014:**

**Internal to NETL**

Morgantown, WV Site	17 CXs
Pittsburgh, PA Site	20 CXs
Albany, OR Site	22 CXs
<u>Sugarland, TX Site</u>	<u>0 CXs</u>
Total	59 CXs

**Off-Site (external to NETL) Partnered Projects**

Continental U.S.	566 CXs
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### **3.6 Executive Orders 13423 and 13514**

E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management (January 24, 2007)*, established sustainability goals for all federal agencies. These sustainability goals included:

- Acquiring goods and services that use sustainable environmental practices, including acquisition of bio-based, environmentally preferable, energy efficient, water efficient, and recycled content products.
- Using paper with at least 30 percent post-consumer fiber content.
- Reducing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed.
- Increasing diversion of solid waste as appropriate.
- Maintaining cost-effective waste prevention and recycling programs.
- Meeting at least 95 percent of the requirements for Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic products, unless EPEAT does not have a standard for such product.

- Enabling the Energy Star feature on computers and monitors.
- Establishing and implementing policies to extend the useful life of electronic equipment.
- Using environmentally sound practices relative to disposition of electronic equipment that has reached the end of its useful life.

Subsequently, E.O. 13514 (October 5, 2009), *Federal Leadership in Environmental, Energy, and Economic Performance*, established goals for:

- Increasing energy efficiency.
- Measuring, reporting, and ultimately reducing greenhouse gas (GHG) emissions from direct and indirect sources.
- Conserving and protecting water resources through efficiency, reuse, and storm water management.
- Eliminating waste, recycling, and preventing pollution.
- Leveraging departmental acquisition to foster markets for sustainable technologies and environmentally preferable materials, products, and services.
- Designing, constructing, maintaining, and operating high-performance sustainable buildings in sustainable locations.
- Strengthening the vitality and livability of the communities in which DOE facilities are located.
- Informing DOE employees about and involving them in achieving the goals of E.O. 13514.

NETL's Environmental, Safety, and Health Management System continues to focus on the requirements of these Executive Orders to develop its significant ES&H aspects, its objectives and targets, and ultimately, the associated ES&H Management Plans. Below is a summary of the ES&H significant aspects that address E.O. 13423 and E.O. 13514, and the associated ES&H Management Plans that are used to achieve the respective objectives and targets.

### **Waste Minimization, Pollution Prevention, and Recycling**

For FY2014, the EMPs addressing nonhazardous waste generation, hazardous waste generation, recycling, and construction waste recycling included objectives and targets that address the requirements of both E.O. 13423 and E.O. 13514. As an example, the objective of the *Nonhazardous Waste Generation Plan* was to reduce the amount of routine nonhazardous waste generated by 15 percent by the end of FY2014, based on the 2008 baseline of 222.5 metric tons.

NETL achieved a 14 percent reduction in nonhazardous waste generation; one percent shy of the FY2104 target.

In terms of hazardous waste generation, NETL has significantly exceeded its target. Based on the goals of E.O. 13423 and E.O. 13514, the objective of the FY2014 *EMP for Hazardous Waste Generation* was to reduce the amount of routine hazardous waste 0.80 metric tons, using an FY2011 baseline of 3.0 metric tons. By the end of FY2014, NETL was able to achieve a reduction to 0.78 metric tons, a reduction of 74 percent.

The objective of the FY2014 *EMP for Nonhazardous Waste Recycling* was to increase diversion of nonhazardous solid waste from disposal by 40 percent using an FY2010 baseline (632,723 pounds). By the end of FY2014, NETL had achieved 538,689 lbs. percent of recycling of its sanitary waste streams, or 85%. Likewise, NETL also continued to be successful in its efforts with regard to the *EMP for Recycling Construction Waste*. The plan's objective is to recycle a minimum of 47 percent of construction/demolition waste and divert it from landfill disposal by the end of FY2014. NETL diverted 95 percent of its construction/demolition waste to recycling.

### **Hazardous Materials Procurement, Consumption, and Storage**

For FY2014, the significant aspect for addressing hazardous materials procurement, consumption, and storage focused on NETL's chemical inventory. The primary objective of the *EMP for Chemical Inventory* was to reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015, based on E.O. 13514. NETL was able to achieve only a 1.8% percent increase in the number of containers (235), which resulted in a 3.3 percent increase in chemicals by weight, compared to the baseline established in FY2010. This minimal increase was within the no net gain of chemicals (+/- 10 percent) target for FY2014. However, the target to assess whether there were opportunities to decrease the amounts of liquid nitrogen, carbon dioxide, and hydrochloric acid in the chemical inventory was not completed in the fiscal year. In addition, only a 93 percent of NETL employees had completed Global Harmonization System (GHS) training as required by March 1, 2014.

### **Green Purchasing**

The FY2014 *EMP for Green Purchasing* focused on various aspects of E.O. 13514, including maximizing site use of environmentally preferred products (EPPs) in operation and maintenance, janitorial, and general office activities; purchasing products that are recycled, bio-preferred, Energy Star, Federal Emergency Management Program (FEMP)-designated, EPEAT-registered, WaterSense or otherwise water efficient; acquiring uncoated printing and writing paper containing at least 30 percent post-consumer fiber; reducing printing paper use; ensuring that 95 percent of new contract actions for products and services are energy and water efficient; have bio-based and environmentally preferable, non-ozone depleting, recycled content; and are non-toxic or less toxic than alternatives. The FY2014 targets were to achieve the following: 95% of new contract actions for products and services are: energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives; 70 percent of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's (GSA's)

Green Purchasing Standards; and 98 percent of copier and printer paper shall contain a minimum of 30 percent recycled post-consumer fiber. As a result, in FY2014, NETL achieved the following: 97% of contract actions will be energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives; 93.85% percent of janitorial cleaning products are environmentally preferred products through its storeroom purchases; and 97.5 percent of copier and printer paper contains a minimum 30 percent recycled post-consumer fiber through storeroom purchases.

### **Electronic Stewardship**

To further address the goals of E.O. 13514, the *EMP for Purchase of Electronic Products* had the objective of ensuring that the procurement of EPEAT-registered electronic products, and the procurement of Energy Star and Federal Emergency Management Program (FEMP)-designated electronic equipment. In FY2014, NETL was able to acquire 99 percent of its electronic products as EPEAT-registered and 100 percent of its electronic products were Energy Star- and FEMP-designated. In addition, in FY2014 the objective for the *EMP for Operation and Maintenance of Electronic Products* was to enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. In FY2014, 100 percent of the printers and 97.93 percent of PCs had power management settings in place.

### **Pest and Other Landscaping Management**

To further address the goals of E.O. 13514, NETL expanded the *EMP for Pest and other Landscaping Management* with the continued objectives of maintaining the deer population at a sustainable level per the wildlife management plan and implementing pest management and other landscaping management practices. In FY2014, NETL worked with USDA representatives in West Virginia and Pennsylvania regarding a time frame to conduct another survey. Based on a proposed survey in November 2014, NETL planned to prepare for a culling sometime in the spring (or at the USDA's recommendation) of 2015 at both sites.

### **Water Use**

To address the goals of E.O. 13514, NETL's objective was to reduce water consumption intensity, relative to the baseline of 27.3 million gallons (which equates to 26.3 gallons/gross square foot [gal/gsf]) through life-cycle cost-effective measures, by 2 percent annually through FY2020, or 26 percent by the end of FY2020 using a baseline of FY2007. NETL's FY2014 potable water intensity was 16.66 gal/gsf. This equates to a 36.7 percent reduction in water consumption.

### **Energy and Fuel Use**

To address the goals of E.O. 13514, the revised FY2014 *EMP for Energy Intensity* required a 3 percent per year reduction in energy use, as well as a reduction in the energy intensity in buildings in an effort to reduce greenhouse gas emissions. NETL was not able to meet its target of 27 percent reduction in energy intensity. NETL's energy intensity of 167,625 Btu/gsf equates

to a 25.1 percent reduction, relative to FY2003 baseline of 223,700 Btu/gsf. This reduction in energy intensity was achieved through persistent NETL efforts to reduce building and laboratory energy usage. The significant increase in energy intensity from 117,400 Btu/gsf in FY2013 to 167,625 Btu/gsf in FY2014 was due mostly to the fact that NETL Pittsburgh's new natural gas provider did not offer a landfill gas supply option. Therefore, NETL Pittsburgh's total natural gas consumption counted against NETL's FY 2014 energy intensity. Other factors in the increased energy intensity included the SBEUC and a colder heating season at all 3 NETL sites.

The objectives for the FY2013 *EMP for Renewable Energy* include increasing renewable energy consumption to 7.5 percent and ensuring that 50 percent of statutorily required renewable energy comes from sources developed after 1999. This level of electric energy from renewable sources is not economically feasible or technically practicable for NETL due to its geographic location and weather. NETL's FY2014 renewable electric energy use was 0.14 percent of its total electric use. NETL met the EPCRA 2005 mandate for renewable energy by purchasing EPCRA 2005 approved renewable energy certificates (RECs). NETL also met the E.O. 13514 goal for on-site renewable energy generation and renewable electrical energy purchase requirements (3.75 percent) equal to 50 percent of the EPCRA 2005 goal of 7.5 percent relative to renewable sources developed after 1999 by purchasing RECs from "new" renewable sources.

The objective for the FY2013 *EMP for Petroleum Fuels* was to reduce the vehicle fleet's total consumption of petroleum products by 2 percent annually through the end of FY2015 (using a FY2005 baseline). NETL met the target for FY2014 (a reduction of 18 percent). NETL was actually able to reduce its petroleum fuel usage to 9,942 gallons, a 54 percent reduction from the FY2005 baseline.

Also, in addressing the goals of E.O. 13514, the FY2013 *EMP for Alternative Fuels*, NETL continued to promote alternative fuel consumption and to increase the use of low GHG-emitting vehicles. The objective of the FY2014 *EMP for Alternative Fuels* is to increase total nonpetroleum-based fuel consumption by 10 percent annually through FY2020, using an FY2005 baseline. However, in FY2014, NETL did not meet the plan goal due to a DOE Headquarter mandate directing NETL to replace certain vehicles with petroleum-fueled hybrid vehicles. The new hybrid vehicles are credited as alternatively fueled vehicles (AFVs), but the gasoline used to fuel these vehicles must be reported as petroleum usage. The implementation of the replacement mandated in FY2014 severely impacted NETL's successful Alternative Fuel Use Increase Plan. As a result, NETL only met 52.6 percent of the required 136 percent FY2014 goal. In addition, the Secretary of Energy mandated a 35 percent reduction of non-critical vehicles from existing fleets. To meet this mandate, NETL reduced its fleet inventory from 65 vehicles to 56 vehicles. This reduction in size of NETL's fleet also reduced the amount of alternative fuels usage.

Also, in the energy and fuel use area and regarding E.O. 13514, NETL's FY2014 *EMP for Advanced Metering*, the objectives are (1) to install advanced electrical metering in NETL's buildings greater than 1,000 gsf (by October 1, 2012) and (2) to install advanced metering for natural gas and potable water in NETL's buildings greater than 1,000-gsf (by October 1, 2015). The target for FY2014 was to install advanced electrical meters at the Albany site in all buildings over 1,000 square feet and within the scope of NETL's Consolidation Plan. One-hundred

percent of the meters at the Albany site have been installed. In addition, another FY2014 target was to install utility meters in Morgantown buildings as follows: B-6-water; B-7-water; B-8-water; B-12- water; B14-electric; and B22A-electric. All programming and commissioning of the meters was completed. These meters are fully operational. In FY2010, NETL developed a *Data Center Energy Efficiency Optimization Plan* and submitted it to DOE Headquarters. The objective of the plan is to implement best management practices in energy efficient management of servers and federal data centers. In FY2014, the objectives for the *EMP for Management of Servers and Data Centers* were (1) to have dedicated smart meter installed in the B-39 data centers; (2) evaluate B-39 and B-922 data centers using DOEGRIT; and (3) review, design, and implement energy efficiency upgrades to B-39 and B-922 data centers. Permanent meters were installed in B-922 and the SBEUC, but the B-39 meter has not been installed. DOE required that only “Core” data centers be evaluated with DOEGRIT. In FY2014, NETL used DOEGRIT to evaluate NETL’s only “Core” data center, the B39 data center. Energy efficiency upgrades were considered for the B-39 and B-922 data centers and one energy efficiency upgrade for the B-39 data center was reviewed and designed; and will be implemented in FY2015.

### **Air Emissions/Greenhouse Gas Emissions**

The FY2010 *EMP Addressing GHG Emissions* was expanded in FY2011 to address the more rigorous requirements of E.O. 13514. The objectives for FY2010 were: (1) to establish agency-wide GHG emission percentage reduction targets to be achieved by FY2020-to be established using an FY2008 baseline; (2) to prepare a baseline of GHG emissions for Scope 1 and Scope 2 emissions by January 3, 2010; and (3) to prepare a baseline of GHG emissions for Scope 3 emissions by June 2, 2010. Other objectives supporting E.O. 13514 include reporting a comprehensive GHG emission inventory annually by the end of January each subsequent year; implementing transit, travel, training, and conferencing strategies to support low-carbon commuting and travel; and implementing innovative policies to address Scope 3 emissions unique to agency operations. In FY2012, the GHG emission reduction percentage was identified as 28 percent by FY2020, using a FY2008 baseline. In addition, NETL’s GHG emissions FY2008 baseline was updated in NETL’s *Site Sustainability Plan*. In terms of FY2014 Scope 3 emissions, NETL reported 3,761 metric tons CO<sub>2</sub> equivalent (CO<sub>2</sub>e), relative to FY2008 emissions of 6,487.4 metric tons CO<sub>2</sub>e, meaning NETL decreased its Scope 3 emissions by 42 percent. NETL has developed a plan and methodology to reduce its Scope 3 emissions. NETL’s FY2014 Scope 1 and 2 GHG emissions were 17,914 metric tons CO<sub>2</sub>e. This is a 33.9 percent decrease from the FY2008 baseline, which meets the FY2014 goal of reducing Scope 1 and 2 GHG emissions by 19 percent from the FY2008 baseline. NETL’s purchase of RECs contributed to the reduction of Scope 2 GHG emissions in FY2014.

### **High-Performance Sustainable Building Implementation**

E.O. 13423 identifies and E.O. 13514 re-establishes that all new construction or renovations of existing government facilities or buildings greater than 5,000 gsf comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB) Memorandum of Understanding* (2006). E.O. 13423 and E.O. 13514 require that 15 percent of the existing federal capital asset building inventory meets the HPSB guiding principles. Additionally, DOE Order 430.2b states that any new building or facility designed and built to U.S.

Green Building Council's (USGBC) rating system of "Leadership in Energy and Environmental Design" (LEED) specification and is awarded LEED Gold certification meets the HPSB requirements. In FY2009 and FY2010, NETL performed an assessment of all existing buildings to develop a cost-effective HPSB plan. Analysis of the assessment identified the seven buildings to be renovated to comply with the five guiding principles of HPSB by FY2015. In FY2014, NETL updated this assessment and added three additional buildings to the HPSB Plan ([Table 3.6.1: NETL HPSB Plan](#)). NETL has incorporated these projects into the NETL Ten Year Site Plan and General Plant Project (GPP) planning. In FY2014, NETL was in the process of performing EISA 432 Energy and Water Evaluations for the majority of NETL's covered facilities, including the buildings in the HPSB Plan. These Energy and Water Evaluations will be completed in FY2015.

Table 3.6.1: NETL HPSB Plan					
	FY	Compliance	Assessment Findings	Number	Plan Status
<b>Existing Buildings</b>					
MGN B-39	2009	LEED Gold	Meets HPSB Criteria	1	Complete
PGH B-58	2015	HPSB	Meets 55 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
PGH B-900	2015	HPSB	Renovation to HPSB GPs completed.	1	Data Collection
PGH B-925	2015	HPSB	Meets 60 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
PGH B-920	2015	HPSB	Meets 60 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
PGH B-921	2015	HPSB	Meets 50 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
MGN B-1	2015	HPSB	Meets 45 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
MGN B-26	2015	HPSB	Meets 45 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
ALB B-26	2015	HPSB/ LABS 21	Meets 50 percent of HPSB GPs. Upgrades to HVAC and energy efficiency measures required.	1	Data Collection
<b>New Construction (&lt;\$5 mil)</b>					
MGN B-40	2013	LEED Gold	Meets HPSB Criteria	1	Complete
Total # of HPSB Buildings				10	

Per the DOE *Strategic Sustainability Performance Plan*, DOE considers any new building that achieves a rating of Gold or better for the LEED Green Building Rating System for New Construction to comply with the requirements of the HPSB guiding principles. In FY2011, one NETL building met the HPSB guiding principles with a LEED Gold certification, Morgantown B-39. In FY2014, B-40 in Morgantown attained LEED Gold Certification, thus meeting the HPSB Guiding Principles.

Activities included implementing the renovations proposed by DOE's FEMP "Expert Energy Efficiency Evaluation" (E-4 Assessment) that was performed for NETL's Morgantown and Pittsburgh Sites in FY2011. This E-4 assessment provided NETL with more insight into the renovations required to help NETL meet the HPSB guidelines for the buildings identified in [Table 3.6.1](#): NETL HPSB Plan.

## Summary

NETL continued implementing numerous activities to address the mandated goals of E.O. 13423. This included procuring energy efficient products; utilizing energy-saving performance contracts; and finally, updating design, construction, renovation, and maintenance packages in order to incorporate new federal building design and performance standards, to procure renewable energy, and to implement innovative energy management technologies and water conservation measures.

NETL issued its Site Sustainability Plan, as mandated by E.O. 13514 and per the requirements of DOE's *Strategic Sustainability Performance Plan* (SSPP). The new SSP included strategies and annual implementation steps to ensure compliance with EPA05; E.O. 13423; DOE Order 436.1, Departmental Sustainability; the Energy Independence and Security Act of 2007 (EISA07); and E.O. 13514. The SSP also includes requirements consistent with the new DOE Order 430.2b.

As a part of each decision to undertake new projects and investments, NETL performs life-cycle cost analyses. In 2014, these analyses were used for projects involving equipment retrofit and replacement; renewable energy; lighting retrofit; water savings; and HVAC control. These analyses, coupled with energy efficiency, renewable energy, and water efficiency mandates required by DOE, help to determine the optimum time to undertake a retrofit project during the life span of equipment or facilities. To further guide the decisions about priorities for energy-efficiency improvements to infrastructure, NETL, during fiscal year renovations, conducts specific construction-project energy audits. Additionally, NETL's *Ten-Year Site Plan* includes energy-efficiency upgrades and water conservation projects in its general plant project (GPP) budget requests.

DOE Order 430.2b and E.O. 13514 also recommend that sites maximize utilization of third-party financing; in particular energy savings performance contracts (ESPC), in order to accomplish the mandated goals associated with the previously mentioned federal government directives. Under that premise, on August 28, 2009, NETL awarded the Biomass Alternative Methane Fuel Energy Savings Performance Contract (BAMF ESPC) to Constellation Energy, a Mid-Atlantic Energy Services Company. The BAMF ESPC incorporates implementation of 13 energy conservation measures (ECMs) at the Morgantown, Pittsburgh, and Albany sites.

NETL continued with the implementation of the 13 ECMs identified in the BAMF ESPC through Constellation Energy's Delivery Order 4 schedule ([Table 3.6.2](#)). Once all the ECMs have been installed, commissioned, and accepted by NETL, the annual energy savings are guaranteed to be 23.9 BBtu, with an annual guaranteed cost savings of \$750,000. Of the

13 ECMs identified in the BAMF ESPC, seven were completed in CY2009 and four were completed in CY2010.

Table 3.6.2: BAMF ESPC through Constellation Energy's Delivery Order 4 Schedule				
ECM No.	Energy Conservation Measure	Location	Estimated Total Energy Savings MBtu/yr	Completed Y/N
1.	Steam Biogas Conversion	Pittsburgh	13,786	Y
2.	Utilize On-site Natural Gas	Morgantown	1,332	N
3.	Water Saving ECMs	Pittsburgh	34	Y
4.	Water Saving ECMs	Albany	4	Y
5.	Renewable Energy Systems	Pittsburgh	2	Y
6.	Renewable Energy Systems	Morgantown	27	Y
7.	Lighting Improvements	Pittsburgh	2,509	Y
8.	Lighting Improvements	Morgantown	1,390	Y
9.	HVAC Control Improvements	Morgantown	2,078	Y
10.	Lab Hood Control Improvements	Morgantown	844	N
11.	Vending Machine Controls	Pittsburgh	51	Y
12.	Compressed Air Improvements	Pittsburgh	79	Y
13.	Advanced Metering	Pittsburgh	1,725	Y
	<b>Total Savings</b>	<b>All</b>	<b>23,862</b>	

The remaining two ECMs: ECM #2 on-site natural gas utilization and ECM#10 B-25 lab hood control improvements, ( at NETL-MGN), were replaced with a project to retrofit the Morgantown parking garage lighting system with an high-efficiency LED lighting and control system. This project will reduce NETL's overall energy consumption by approximately 13,500 kilowatt-hours annually, and will aid in reducing NETL's energy intensity and Scope 2 GHG emissions (relative to electric energy usage).

Implementation of the BAMF ESPC will provide NETL with an energy savings of 24 percent from its FY2003 baseline, which is the equivalent to meeting 79 percent of its 2015 goal. The BAMF ESPC, when fully implemented using 2007 usage as a baseline, will provide NETL with a 13 percent water intensity savings, which equates to meeting 65 percent of its 2020 savings goal. This BAMF ESPC did not require any capital equipment cost outlays by NETL. The guaranteed annual energy cost savings provides the funding for Constellation Energy to implement the project.

### 3.7 Compliance and/or Cleanup Agreements

Groundwater remediation efforts in Wyoming were ongoing at two sites in 2014: (1) Rock Springs Oil Shale Retort Site in Sweetwater County, Wyoming; and (2) Hoe Creek Underground Coal Gasification Site in Campbell County, Wyoming. In the 1960's and 1970's, these sites were experimental R&D field sites for in situ oil shale retorting experiments and underground coal gasification, respectively.

From 1965 to 1979, the U.S. DOE's, Laramie Energy Research Center conducted in situ oil shale retorting experiments at a facility located seven miles west of the town of Rock Spring, Wyoming. DOE leased this property from the owner of the land, Rock Springs Grazing Association, and from the owner of the mineral rights, Rocky Mountain Energy Company. The

Rock Springs facility encompasses 340 acres and contains 13 former experimental sites (covering 35 acres). After research activities ended, DOE performed a site-wide surface reclamation in 1982. In 1997, DOE completed a site-wide groundwater characterization. As a result, the Wyoming Department of Environmental Quality (WDEQ) has required groundwater remediation at six of the 13 retort sites (4, 5, 6, 7, 9, and 12). Beginning in 1998, a variety of groundwater technologies were implemented. These included pump and treat, bioremediation, and air sparging.

WDEQ identified benzene as the contaminant of concern; the restoration goal is 5 ug/l. WDEQ has also determined that the best practicable technology for remediation is to conduct air sparging and pumping. Once WDEQ has approved the successful groundwater remediation at each experimental site, DOE is permitted to request closure of each site. This does not involve bond closure, as bonds were not issued, only a Temporary File Number has been issued.

From 1976 to 1979, the U.S. DOE's, Lawrence Livermore Laboratory conducted underground coal gasification research at Hoe Creek facility, which is south of Gillette, Wyoming, on 74 acres of property owned by the Bureau of Land Management. In 1982, responsibility for the site was transferred to the Laramie Energy Technology Center. Three separate experiments were run: the first lasted 11 days; the second lasted for 58 days; and the third lasted for 47 days. After research activities ended, DOE conducted groundwater remediation activities from 1986 to 2007, including pump and treat, bioremediation, and air sparging. WDEQ approved successful groundwater remediation at Sites 1 and 2 in 2005 and at Site 3 in 2012. DOE removed all wells in the summer of 2012 and completed decommissioning and reseeded in the fall of 2012. Only surface reclamation activities occurred in 2014. Because WDEQ requires acceptable quantitative measurements of the revegetation from two growing seasons before approving that the revegetation is successful, surface reclamation activities occurred in 2014. The first quantitative report of the revegetation was issued in the summer of 2014. Once two quantitative reports have been approved, DOE will be permitted to initiate the bond closure process.

### **3.8 Environmental Violations Cited by Regulators/Notices Issued**

Regulators cited no new environmental violations in calendar year 2014.

### **3.9 Groundwater**

Groundwater protection at NETL is administered through Procedure 436.1-03.02, Groundwater Quality Management. The program covers regulatory requirements and best management practices to prevent leaks and spills, to monitor groundwater and soil, to remove contaminated soil, and to address closeout actions. More detailed information is provided in NETL's Groundwater Protection Management Plan, which documents site hydrogeology, potential pollution sources, potential contaminants to be monitored, well installation and sampling methods, a monitoring strategy, and QA/QC processes. Maps of the site aquifers and wells are also in the plan.

Each site has specific reasons for monitoring its groundwater. For example, 20 active monitoring wells exist at the Morgantown site. These wells monitor two shallow aquifers within the

unconsolidated Lake Monongahela sediments and one bedrock aquifer, the Morgantown Sandstone. None of these aquifers are used as a source of water in the immediate area. Selected monitoring wells are sampled and tested for general water-quality parameters. Should a spill occur, containment and cleanup would commence, and the affected soil would be monitored, as necessary, for the contaminants of concern.

Similarly, the Pittsburgh site has 23 monitoring wells. A total of 19 wells are screened in shallow weathered bedrock; seven are located in the R&D Plateau area, and 12 are in the Valley Fill area. The topography, consisting of rolling hills and ridges, reflects the dendritic drainage erosion of the uplifted Allegheny Peneplain. The primary objective of the Groundwater Monitoring Program (GMP) at the Pittsburgh site is to monitor the shallow, weathered bedrock zone as the first significant aquifer or water-bearing unit beneath the Pittsburgh facilities of NETL. Contamination entering the ground from soil surface sources would be expected to impact this zone first and foremost; hence, the majority of wells are placed in this zone. The GMP also monitors the wells screened in the deeper water-bearing zone to provide data on water quality and contaminant migration. Another goal of the monitoring program is to identify and characterize groundwater flow and relate it to surface water flow conditions to better evaluate potential environmental effects of any groundwater contamination.

Finally, the groundwater protection and monitoring program in Albany (initiated in 2001) is aligned with the Oregon Department of Environmental Quality (ODEQ) Voluntary Cleanup Program. Albany groundwater monitoring includes 33 wells and two piezometers. The wells are sampled for a broad range of contaminants, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, nitrates, and PCBs. Current plans include the continued development of a conceptual site model to document groundwater and contaminant trends. Once the model is complete, and subject to funding, NETL will assess the results and plan future remediation activities. NETL will continue to provide the ODEQ monitoring reports.

### **3.10 Reportable Occurrences**

The Department's Occurrence Reporting Program provides timely notification to the DOE complex of events that could adversely affect: the public, or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, functioning of DOE facilities, or the Department's reputation.

The Morgantown site filed three facility status in compliance reports with the Department's Occurrence Reporting and Processing System (ORPS) in 2014. In the first instance, a construction contractor was in the process of installing new isolation valves in an existing chilled water piping system. The water system, which was within a mechanical room, had a section of the chilled water piping removed in order to prepare for isolation valve installation. The weld on the flange connection was nearly completed when fluid began to flow from the supply side of the chilled water pipe. Approximately 500 gallons of 40% ethylene glycol/60% water solution spilled into the mechanical room. The spill eventually spread into a utility tunnel and adjacent ground floor areas, soaking carpet in the immediate area.

The second Morgantown report involved a hydrogen and methane release, resulting from defective laboratory process controls. According to the report, a relay in the lab interlock control system failed, causing a controlled shutdown of the unit. Part of the shutdown process involved the gas line block valves going to their fail-safe position and all system controller set points being set to appropriate shutdown values. This meant that the argon line failed-open to initiate a purge, while the methane, hydrogen, and house air-line block valves stayed in their already closed, fail-safe positions. Due to a flaw in the control system, within seconds of the shutdown initiation, the block valves all reversed their positions. This opened the methane, hydrogen, and house air lines and closed the argon line. With the flow controllers removed from the system and the lines uncapped; the methane, hydrogen, and air vented into the lab. The hydrogen eventually set off a carbon monoxide alarm monitor, which is cross-sensitive to hydrogen gas. The DAN system recorded that the combustible gas monitor reached 21% of the Lower Explosive Limit for the lab, and the carbon monoxide monitor reached 500 ppm (which is its full range).

The third Morgantown report involved a generator that was indicating: (1) an RPM sensor loss, (2) coolant temperature sensor fault, and (3) an active shutdown alarm. The battery in the generator cowling had over-pressurized and the top of the battery casing failed. This resulted in a sulfuric acid spill. It was determined that a 12-volt, lead-acid automotive battery failed and exploded. The generator was taken out of service.

The Pittsburgh site filed four reports in ORPS in 2014: one noncompliance notification related occurrence report; one uncontrolled hazardous energy source; one operations shutdown; and one facility status related occurrence report.

The Pittsburgh noncompliance notification related occurrence report was the result of turbid water being released into the site's storm water discharge system. The turbid water resulted from a NIOSH contractor repairing a fire water sprinkler system connection. The water from the opened fire hydrant became contaminated with clean soil sediment resulting in the turbidity, which then flowed into a three agency permitted storm water outfall and subsequently into Lick Run. The National Pollutant Discharge Elimination System (NPDES) storm water permit for this outfall restricts the release of turbid water. Verbal notification of the permit violation were provided to Pennsylvania Department of Environmental Protection (DEP), as required.

The Pittsburgh uncontrolled hazardous energy source report was issued as the result of a construction contractor excavating with a backhoe during a water line installation project. While in the process of excavating, the equipment operator hit a two-inch plastic natural gas line. The incident caused damage to the gas line and caused a very small slit. There was small audible hissing sound and the smell of natural gas (mercaptan) evident. This occurrence initiated activation of the Emergency Response Organization's Incident Evaluation Task Force.

The third Pittsburgh report was an operations shutdown caused when an employee was operating a zero-turn lawn mower ran the mower over a retaining wall. The operator reported that the mowers rear wheels slipped on a sloped embankment covered with wet grass and when the operator corrected the steering he was unable to avoid going over a 3-foot retaining wall at the bottom of the embankment. The mower's front wheels went over the retaining wall and came to rest on pavement three feet below; its rear wheels came to rest on the top of the retaining wall.

The fourth Pittsburgh facility status report was the result of a fire main break discovered near a fuel dispensing station. A 30 ft. by 30 ft. area was undermined due to the water flow and the pavement was heaved upward in the area. The fuel tanks were not damaged by the water release, however, due to the resulting fire-suppression water outage, sprinkler service was disabled for the adjacent buildings.

In addition, the Wyoming site filed one facility status related occurrence report in ORPS in 2014. According to the report, an employee discovered there had been a fire within a compressor building at the remote Site 9 in-situ oil shale retort groundwater remediation site (Rock Springs, Wyoming). As the compressor building is a normally unoccupied metal building on a concrete slab floor, the employee noted the interior was covered in soot and smelled of smoke upon entering. There were no signs of an active fire. The fire department was contacted and responded to investigate. Upon completion of their building inspection, the fire department inspector found the fire had self-extinguished. Physical damage was limited to the northeast corner of the building, but combustion byproducts (soot) covered all surfaces within the building. The building contains two 50 horsepower compressors, an electric mounted heater, and numerous solenoid valves (electric). Building contents are government equipment purchased by the U.S. Army Corps of Engineers (USACE). No equipment damage was immediately evident.

The Albany site filed no reports ORPS in 2014.

### **3.11 Major Issues, Instances of Non-compliance, and Corrective Actions**

No major issues, instances of noncompliance, or corrective actions were reported at NETL in 2014. Concerns over potential groundwater contamination with VOCs and surface contamination at the Albany site are discussed in Section 9.8.

### **3.12 Status of Ongoing Third-Party Inspections, Self-Assessments, and Environmental Audits**

The Pittsburgh and Morgantown sites originally received certification to the ISO 14001 standard on August 31, 2003, while the Albany site received certification for the ISO 14001 standard June 9, 2005. All three sites were recertified to the same scope by Orion Registrar, Inc., in 2010. To maintain these certifications, recertification and surveillance audits are conducted to demonstrate continual improvement in the ES&HMS and conformance to the ISO 14001:2004 and OHSAS 18001:2007 standards.

In 2014, NETL underwent three surveillance audits with regard to the ISO 14001/OHSAS 18001 standards. The first surveillance audit in calendar year 2014 was conducted at the Morgantown and Pittsburgh sites, March 19-20, 2014, by Orion Registrar, Inc. No new nonconformities were documented during this audit. The auditor identified one Opportunity for Improvement (OFI) involving the calibration of advanced meters installed at the Morgantown site to monitor energy and water usage. Because these meters would require calibration in the future, an opportunity for improvement was identified to have a calibration plan in place. (At the time of the audit, the meters were under warranty and the calibration was not due.) The auditor also identified the following strengths: (1) the last management review was found to be comprehensive, including

the tracking and generation of action items; (2) the internal audit report (2013-2) provided good coverage; (3) the practice of issuing one audit report for a series of internal audits provides a vehicle for identifying trends and systemic problems; (4) the SARS procedure continues to ensure that specific project environmental aspects and hazards are identified and appropriately addressed; (5) there is a high level of engagement for all personnel in the ES&H activities; and (6) the contractor and visitor ES&H orientation is well done.

Orion Registrar, Inc. conducted a surveillance audit at the Albany site July 15, 2014. The auditor identified one minor nonconformity regarding the timeliness of corrective action tracking process. The finding indicated that corrective actions for internal audit nonconformities are perceived to be noncritical and tend to linger. In spite of some progress, there seems to be a barrier to further improvement. Procedure 450.4-4 (Corrective and Preventive Action Process) requires that corrective actions be completed by their respective due dates. No new OFIs were documented during this audit. The auditor identified four strengths: (1) management reviews continue to be comprehensive and well done; (2) posted safety signage was found to be complete and consistent with the personal protection equipment and other requirements; (3) SARS associated with the lab in Building 28, Room 113 and its implementation were found to be exemplary; and (4) Building 4 ventilation project construction SARS package and the associated ES&H project records were well done.

NETL underwent a third surveillance audit at the Morgantown and Pittsburgh sites, November 19-20, 2014, by Orion Registrar, Inc. No new nonconformities were documented during this audit, however, one minor nonconformity remains open regarding the timeliness of findings the corrective action tracking system being addressed. ESS&H continues to work with responsible persons who have open corrective actions, and it is expected that the existing corrective action tracking system (AIIS) is to be replaced. The auditor identified three OFIs. The first OFI was regarding the SARS for the Chemical Looping Reactor. The standard operating procedure did not clearly address the loss of electrical power as identified in the SARS Hazard Chart. The second OFI was for the cafeteria services SARS requirement with regard to the use of Class K fire extinguishers in the event of a fire in the deep fryer. An opportunity for improvement exists to align the SARS requirements with the current practice regarding fire extinguisher use. The third OFI was with regard to the door repair/replacement construction project. The Hazard Analysis Checklist form for the project indicated that potential hazards and OSHA subpart references associated with material handling were not appropriate. An opportunity for improvement existed to review the references for relevancy. In addition, the auditor identified the following strengths: (1) assignment of well-qualified personnel to the ES&H management system has resulted in it being effectively and efficiently maintained and sustained; (2) the audit plan and findings documented in the last internal audit report (2014-2) provided evidence of good coverage and the effectiveness of the audit team in finding meaningful things to act on to improve the ES&H management system; (3) the posting of ES&H signage was found to be consistent with the activities in the designated areas and cover all points of entry; and (4) the ES&H management plan associated with alternative fuels was exceptional in the terms of exceeding established metrics of increasing alternative fuel use and decreasing petroleum usage.

By maintaining its ISO 14001/OHSAS 18001 certifications, NETL demonstrates to its work-force, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental, safety, and health stewardship.

### **3.13 Summary of Environmental Permits**

A summary of environmental permits for the Morgantown, Pittsburgh, and Albany sites is provided in [Table 3.13.1](#), 2014 Summary of Permits.

### **3.14 Emergency Preparedness**

NETL's Emergency Management Program is responsible for providing appropriate incident response measures that enhance the health and safety of our workers and the public while protecting and sustaining the environment. NETL's key to emergency preparedness is founded in identifying potential hazards and developing program measures to address these risks. To this end, hazards surveys were updated for hazards-based programs at three NETL sites with an enhanced and improved methodology for conducting hazards surveys. The revised methodology provides a timelier and more accurate approach to identifying conditions to be addressed by NETL's comprehensive emergency management program. The method for conducting hazard assessments has also been improved with the employment of newly acquired air dispersion plume modeling software. Hazard assessment updates will be completed in early 2015 to identify and further refine the technical basis for NETL's comprehensive emergency management program.

Training is the cornerstone of preparing for emergency incidents. NETL boasts a robust emergency response organization (ERO) training program with over 150 volunteer responders regularly participating in course instruction. NETL frequently conducts hazardous material-based emergency drills and is preparing for growing national security threats as evidenced through active shooter exercises completed at the Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania, sites this past year. NETL has also devoted significant attention to developing protective actions to deal with natural phenomena incidents. Shelter-in-place events have been further defined with specific protective actions assigned to each event type. Evacuation, accountability, and shelter-in-place response actions are being enhanced for site implementation. NETL has augmented its mass casualty plan with vehicle assignments for patient transport, designation of medical aircraft landing zones, and the acquisition of all-terrain patient transport vehicles needed to access off-road and potential debris strewn areas. The concept of mobile emergency operation centers (EOCs) already established at some NETL sites is being enhanced and broadened to all NETL sites. Also, EOC hardware, software, and emergency asset improvements have been made at all NETL sites which have enhanced emergency management of incidents.

The 2014 emergency exercise scenarios are summarized below:

## **NETL-Albany, Oregon**

The scope of play for this full-scale exercise involved an active shooter incident resulting in a hostage rescue response. NETL employees engaged in a heated conversation which led to gunfire, wounded employees, hostages, and a shooter stand-off situation. Successful completion of the exercise required NETL ERO resources to efficiently and effectively implement crisis management techniques to resolve the incident in coordination with responders from the Linn County Regional SWAT Team, Linn County Emergency Management Program, and Albany Fire Department.



**Photo 3.14.1: Linn County Regional SWAT Team Mobilizes During Albany Full-Scale Exercise**



**Photo 3.14.2: Albany Law Enforcement Personnel Secure Perimeter During Albany Shooter Exercise**

## **NETL-Morgantown, West Virginia**

The full-scale exercise at the Morgantown site involved an active shooter incident resulting in a hostage rescue response. NETL employee disagreements initiated a situation leaving one employee shot and four others being taken hostage by the gunman. Resolution of the incident required NETL ERO resources to employ efficacious implementation of crisis management protocols in coordination with responders from the Morgantown Police Department SWAT Unit, Monongalia County Sheriff's Office SWAT Unit, and Monongalia County Homeland Security Emergency Management Agency.



**Photo 3.14.3: Morgantown Police Officer Rescues Injured Employee During Morgantown Full-Scale Exercise**



**Photo 3.14.4: NETL EOC Emergency Manager Establishes Communication Link with Incident Commander During Morgantown Shooter Stand-off Exercise**

### **NETL-Pittsburgh, Pennsylvania**

The full scale exercise at the Pittsburgh site also involved an active shooter incident. In this scenario a revengeful NETL employee had taken an employee hostage at gunpoint, breached a security gate, attempted forcible building entry, held building occupants at bay, and initiated gunfire. The exercise event required coordination of NETL ERO resources in conjunction with an integrated response from DOE Office of Inspector General (IG) Special Agents and South Park Township Police Department Officers to successfully resolve the incident.



**Photo 3.14.5: South Park Township Police Department and Regional Emergency Medical Services Mobilize Near Scene During Pittsburgh Full-Scale Exercise**



**Photo 3.14.6: NETL Planning Section (NPS) Personnel Track Emergency Conditions and Response Actions in the EOC During Pittsburgh Active Shooter Exercise**

### 3.15 Quality Assurance

NETL is responsible for a wide range of work activities, including basic and applied on-site research; contract administration for off-site research, development, and demonstration projects; design, construction, operation, modification, decommissioning, and environmental remediation of NETL facilities; and the management and oversight functions related to these activities. NETL's Quality Assurance (QA) Program provides, through Directives (Orders, Operating Plans, and Procedures), the tools to ensure that this work is accomplished safely while minimizing potential hazards to the public, site workers, and the environment. The QA Program is based on DOE Order 414.1, *Quality Assurance* and complements DOE's Integrated Safety Management (ISM) principles (see Diagram 3.15, ISM core functions). NETL's ISM and QA programs are well integrated. Line management accountability for ESS&H issues is an integral part of the QA Program and ISM. NETL implements this through work performance goals for which all line managers are accountable. Internal assessments and audits also ensure that line managers are accountable for their ESS&H responsibilities.

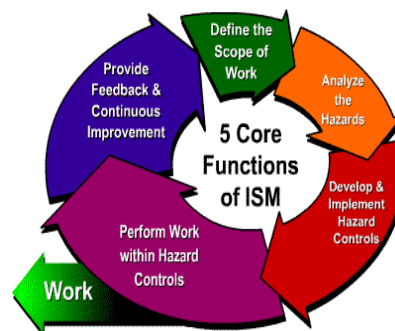


Diagram 3.15: DOE's ISM Principles

The SARS process is the backbone of NETL's QA Program for ESS&H. Much of the needed data regarding hazards and environmental impacts are generated from this process; therefore, its effective performance is important. NETL has four distinct SARS processes: one for R&D, one for facility construction permits, one for facility use, and one for support operations.

The R&D SARS procedure, NETL Procedure 421.1-00.01, describes the process and procedural requirements for a safety analysis and review of on-site R&D projects. Its purpose is to ensure that risks associated with on-site R&D projects are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by line management before work begins. All on-site R&D projects receive a SARS operating permit after successful completion of the review. An annual review is conducted on all SARS-permitted R&D projects by a team comprising, at a minimum, the project's responsible person (or designee), an ES&H representative, a project QA engineer, and the site's environmental manager. The assessment includes (1) checking for significant modifications made to the project without appropriate authorization and SARS review; (2) ESS&H Division inspection of the project area covering chemical hygiene, OSHA requirements, and environmental compliance; (3) review of the SARS files and the project area for engineering design and QA/quality control concerns; and (4) review of problems found in the project area or in the SARS file. Records from each annual assessment are added to the project's SARS file. Findings from the annual assessment are sent to the responsible person for correction and tracked in the corrective action tracking system.

The Construction Permit SARS procedure ensures that NETL construction activities are conducted in a safe and environmentally compliant manner. The final result is an approved construction permit issued prior to construction activities. Initially, the selected contractor will develop and document an ES&H plan. Subsequent activity hazard analyses (AHAs) will be

conducted for construction activities not explicitly covered in the contractor ES&H plans. Similarly, potential environmental impacts due to construction are considered and appropriate mitigations are developed in accordance with applicable codes and standards.

The Facility SARS procedure (421.1-00.03) addresses on-site facilities including buildings, trailers, utilities, services, structures, roads, and walkways. Its purpose is to ensure that facilities are operated, maintained, and modified in compliance with applicable codes, regulations, and standards. The procedure establishes the requirements for obtaining a facility use permit. The systems in place for the Facility SARS Program are effective and contribute to the protection of workers and the environment. The facility use SARS focuses on identifying life safety, fire safety, and electrical safety classifications; assessing the compliance of the facility with applicable codes and standards; documenting any deviations of the facility from applicable codes and standards; and developing mitigations to address code deviations and to establish acceptable risk levels for facility utilization when code compliance cannot be achieved in the near term.

The Support Operations SARS Procedure, NETL Procedure 421.1-00.02, addresses on-site support operations conducted by site support contractors. It includes construction, operations, maintenance, and renovation activities for which the site support contractors are responsible and ensures that associated risks are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by responsible line management prior to initiation of the project or operation. An annual assessment is conducted on all SARS-permitted support operations. The purpose of the annual assessment is to determine the continued validity of the SARS package and to address any changes in the operations. Typical items that might be re-evaluated include changes in site conditions, worker training, operating procedures, and the effectiveness of controls. Findings from the annual assessment are sent to the responsible person for correction and tracked in the corrective action tracking system.

Other mechanisms for ensuring the quality of the ESS&H programs include internal auditing as part of the ISO 14001/OHSAS 18001 certification, surveillance audits related to the ISO 14001/OHSAS 18001 certification, monthly focused inspections, facility inspections and annual emergency response drills and exercises.

Many of the directives that govern the ES&H programs also contain monitoring requirements which ensure that the ES&H programs comply with the directives. For example, the Fire Protection Program governed by Operating Plan 440.1-05, requires that fire protection appraisals be conducted every three years to ensure that hazard to life and property from fires, explosions, or related risks has been evaluated and reduced to acceptable levels, the adequacy of the local fire protection and prevention programs to minimize injury and protect DOE property has been evaluated, and written reports to responsible management, which include recommendations for appropriate action, have been provided.

All of these activities result in findings that are tracked to a final resolution in the corrective action tracking system resulting in continual improvement of the ES&H program.

### 3.16 Performance Measurement

NETL sets performance goals as part of the Enterprise Performance Assessment System (EPAS), which are the metrics which NETL senior management reviews quarterly. The specific performance measures that are tracked and their performance for FY2014 are contained in the following table. The upper target and lower targets are shown for each metric. If the upper target is met, then the metric is considered “met.” If the metric falls between the upper and lower targets, it is treated as “caution,” which means that the performance needs to be investigated to ensure that the metric does not fall below the lower target. A metric that falls below the lower target is considered “not met,” and is investigated to determine why the metric was not met.

Metric	Objective	Target Green (met) Red (missed)	FY 2014 Performance	Organizational Strategic Objective
Days Away, Restricted, Transfer Rate	Maintain low Days Away, Restricted, and Transfer (DART) case rate.	<= 0.4 >0.6	0.27	Ensuring a Safe Working Environment
Environmental Releases	Maintain low reportable environmental releases.	0 >2	0	Institutional Security and Environmental Safeguards
ESS&H Objectives and Targets Achievement	Achieve ESS&H objectives and targets.	>= 85% < 65%	79.2%	Institutional Security and Environmental Safeguards
Facility Security Violations	Maintain low number of security violations and breaches.	0 >2	0	Institutional Security and Environmental Safeguards
Notices of Violation	Maintain low notices of violation (NOVs).	0 >2	0	Institutional Security and Environmental Safeguards
Recordable Case Rate	Maintain low recordable case rate.	>=1.0 >1.5	0.80	Ensuring a Safe Working Environment

All metrics were met, with the exception of ES&H Objectives and Targets Achievement, which tracks all of the ES&H objectives and targets listed below. The rationale for the individual targets not being met are contained within the [Table 2.4.2](#) and [Table 2.4.3](#).

Goal setting is used at NETL to motivate and monitor performance. NETL's environmental performance and progress toward goals is tracked and reported to satisfy both internal and external requirements. Throughout the year, trained ESS&H professionals performed cross-cutting audits and inspections of the NETL ESS&H programs to ensure adequate performance. The performance measures used to monitor progress include EMP objectives and targets (see [Section 2.4](#)) and institutional environmental performance measures. This includes NETL's performance measures established under the Government Performance and Results Act of 1993.

These measures are tracked on a fiscal year basis and cover performance goals and accomplishments. In addition to these measures, surveillance monitoring is conducted through routine reviews and inspections. Examples of the types of performance monitoring conducted through this program are presented in [Table 3.16.1: 2014 Surveillance Monitoring](#).

Table 3.16.1: 2014 Surveillance Monitoring	
Type of Surveillance	
SARS Assessment	
Transformer Inspections	
Storage Tank Inspections	
Interstitial Storage Tank Monitoring (MGN)	
Water Usage (PGH)	
Backup Generators	
Chemical Handling Facility	

## MORGANTOWN

### 4.1 Site Description



**Photo 4.1.1: Morgantown Site**



**Photo 4.1.2: B-39 in Morgantown**

The Morgantown site lies within Monongalia County, West Virginia, on the northern end of the city of Morgantown. The location is about 70 miles south of Pittsburgh, Pennsylvania, and about 200 miles west of Washington, DC. Geographically, the facility sits within the rolling hills of the Appalachian Plateau, about 1,000 feet east of the Monongahela River and about 10 miles west of Chestnut Ridge, the westernmost ridge of the Allegheny Mountains. The site covers approximately 132 acres, 46 of which are developed as industrial. Two small streams border the site on the east and northeast sides, and all surface drainage goes into these two streams. Immediately surrounding the Morgantown site, the land use is a combination of residential, commercial, deciduous forest land, and pasture.

The Morgantown site focuses on technologies in coal utilization, natural gas production and utilization, and energy efficiency. The work is accomplished through both in-house research and development (R&D) and

contracted external research. As of December 31, 2014, 663 employees work at the Morgantown site; 255 are federal employees and 408 are site support contractors.

As of the 2010 U.S. Census, Morgantown's population was 29,660, consisting of 11,701 households within the city limits. The population density was 2,917.0 per square mile. There were 12,664 housing units at an average density of 1,245.2 per square mile. The racial makeup of the city was 89.7 percent White, 4.1 percent African American, 3.4 percent Asian, 2.6 percent Hispanic or Latino of any race, 0.1 percent Native American, 0.1 percent Pacific Islander, and 2.0 percent from two or more races.

The median household income for the Morgantown, West Virginia metro area was \$27,737 in 2010. The per capita income for the city was \$19,437. About 36.7 percent of the population was below the poverty line. The major employers within the Morgantown area are West Virginia University (WVU), WVU Hospitals; Mylan Laboratories, Inc.; the Monongalia County Board of Education; the Monongalia Health System, Inc.; University Health Associates; the National Institute for Occupational Safety and Health; NETL; and the Health South Rehabilitation Hospital.

## 4.2 Major Site Activities

### 1) B-1 Renovation – Ground, 1<sup>st</sup> , and 2<sup>nd</sup> Floor Renovation

B-1 underwent a renovation to improve the overall functionality of the building and increase the available occupancy for contractors. The first phase of the renovation was completed in 2013 and included renovating the third floor offices, replacing utility and service piping, replacing the four HVAC units located in the clerestory with more efficient units, updating the electrical system, replacing the existing roof with a cool roof, and adding a fall arrest system to the roof.

The second phase of the renovation included the complete remodel of the ground, first, and second floors to include new office layouts, furniture, and carpeting. The newly remodeled floors will support the desire to maximize available occupancy for contractors. New HVAC ductwork was installed along with new variable air volume (VAV) boxes and updated controls. The first and second floors have been completed and the ground floor is expected to be completed in 2015.



**Photo 4.2.1a: Teardown of Old Offices**



**Photo 4.2.1b: New Office Layout**

### 2) B-22A Renovation

A renovation of B-22A was completed in order to provide a control area, workstations, high-bay lab space, and storage area. The HVAC system for the building was upgraded to meet heating, cooling, exhaust, and ventilation requirements. Potable water, 120V and 208V power, natural gas, 100# air, and 100# nitrogen utilities, as well as the communications infrastructure were also upgraded. Interior renovations included leveling the concrete floor surface, installation of fume hoods and gas cabinets, work areas, finished interior walls, and motorized roll up door. The existing metal roof and siding were replaced and insulated.



**Photo 4.2.2a: B-22A Renovation**



**Photo 4.2.2b: B-22A Renovation**



**Photo 4.2.2c: B-22A Renovation**

3) **B-4, Rooms 110, 111, and 112 HVAC Replacement**

The HVAC system for rooms 110, 111, and 112 in B-4 was upgraded to address past failure problems which led to frequent and costly repairs. New, more efficient air handling units (AHUs) and cooling and heating units were installed for these rooms and the HVAC controls relocated to a more easily accessible area.



**Photo 4.2.3: New AHUs on the Lower Roof of B-4**

4) **B-17 Facility Upgrades**

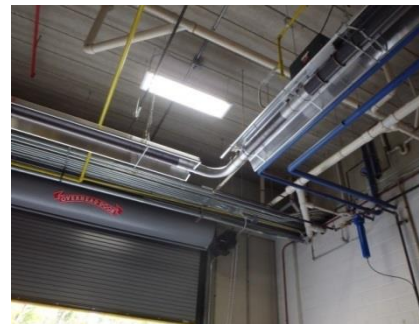
Facility upgrades for B-17 included opening up three large concrete tanks in the basement for new work and storage space, improving the HVAC system with a new AHU, ductwork, VAV boxes, controls, and radiant heating system, the installation of a visualization room and restrooms, new garage roll up doors, and the addition of new sprinkler piping and electrical/communications circuits. Additionally, a modular drilling unit that was originally situated in front of B-18 was moved down to the exterior southeast corner of B-17 and unnecessary exhaust equipment was removed from the building.



**Photo 4.2.4a: New AHU**



**Photo 4.2.4b: Visualization Room and Restrooms Photo**



**Photo 4.2.4c: Radiant Heating**

## 5) Credit Union Relocation

Due to the facility renovations taking place in B-1 and the desire to maximize the use of the newly remodeled space and to minimize the cost of moving, the credit union office was relocated from the first floor of B-1 to B-3, Room 126. Additionally, a small new enclosure building with an ATM was installed outside directly next to the new credit union location.



**Photo 4.2.5a: New Credit Union ATM Enclosure**



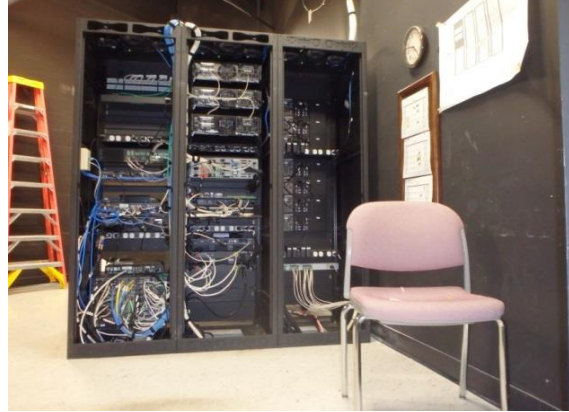
**Photo 4.2.5b: New Office Location**

## 6) B-26 A/V Teleconference Room Upgrades

The audio/visual systems in the B-26 conference facility were replaced due to its aged and outdated condition that contained components that were no longer manufactured. An upgrade for the conference facility was done in order to update both the performance and capability of the conference/training rooms. One upgrade was the addition of a video wall to replace the older projection screen system allowing for better performance.



**Photo 4.2.6a: B-26 Conference Facility**



**Photo 4.2.6b: B-26 Conference Facility**

### 7) **B-3 HVAC Improvements**

HVAC issues pertaining to humidity, air flow, indoor air quality, reheat, distribution, and overall efficiency within Building 3 were corrected. The project included the installation of building pressurization controls including airflow stations on supply, return, and outside air ductwork for the existing AHUs, removal and replacement of motors on two supply fans and two return fans with premium efficiency fan motors with variable frequency drives (VFDs), replacing VAV boxes with electric reheat coils and wireless thermostats, and ending with the testing, adjusting and balancing of the entire system.



**Photo 4.2.7a: New Controls and VAC Boxes**



**Photo 4.2.7b: New Controls and VAC Boxes**



**Photo 4.2.7c: New Controls and VAC Boxes**

### 8) **Morgantown Smoke Shelter**

After the removal of the Trailer 20 smoking area due to its poor condition, a new enclosed smoking shelter was installed at the same location. The new smoking shelter is of steel and glass construction, with bench seating and two heating units with an automatic shut-off feature.



**Photo 4.2.8a: New Smoking Shelter**



**Photo 4.2.8b: New Smoking Shelter**

9) **B-19 Roof Replacement**

The north roof of B-19 was originally installed in 1979 with the remainder installed in 1987 leaving the entire roof exceeding its useful life and increasingly at risk for developing leaks. A new PVC roofing system was installed for each roof with trim, pitch pockets, gutters, downspouts, and all other roofing accessories replaced to accommodate the new roof. In addition, a fall protection system was installed for both roofs.



**Photo 4.2.9a: Old Roof**



**Photo 4.2.9b: New Roof (right)**

10) **B-19 Warehouse/Storage**

In order to maximize the space utilization of the warehouse, several electrical storage bins were removed. This allowed the fenced storage area to increase delivery and storage capabilities.



**Photo 4.2.10: B-19**

#### 11) Potable and Fire Water Line Replacement Design

Much of the Morgantown site's potable and fire protection water piping is original to the site's original construction in the 1950s. Several leaks and breakages requiring emergency repair work have occurred over the years, making the need for an updated and improved piping system to ensure reliable availability of potable and fire protection water. The design work for this project, included the partial replacement of the site potable and fire water lines, installation of backflow prevention devices at all water entrances to the site, and installation of communications conduit alongside the new water lines to allow for future communications infrastructure expansion.



**Photo 4.2.11a: Marked Potable Water Lines at the Morgantown Site**



**Photo 4.2.11b: Fire Water Lines at the Morgantown Site**

#### 12) B-14 Renovation Design

The design work for the renovation of Building 14 included planned demolition/renovation of the existing space to support future laboratory space, a control room, and restrooms. Renovation work also includes upgrades to and installation of mechanical, plumbing, fire protection, and electrical systems. The design entails a complete renovation of the interior of B-14. The high-bay area will see a new concrete floor, two new analytic rooms, new HVAC, new fume hoods and gas cylinder cabinets as well as a refresh of the ceiling and

walls. The Building 14 annex will be converted from an open space to a control room with two new doors, a communications closet, new conference/break room and new restroom.



**Photo 4.2.12: Existing Interior of B-14**

## COMPLIANCE STATUS

### 5.1 Environmental Restoration and Waste Management

#### CERCLA

Morgantown had no National Priorities List (NPL) sites in 2014 and has never been proposed as an NPL site. Furthermore, NETL has never been on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list or the West Virginia Hazardous Waste Site list (state equivalent of CERCLIS). There were no reportable releases in 2014.

#### SARA Title III

Superfund Amendments and Reauthorization Act (SARA) Title III requires the reporting of hazardous chemicals that were present at a facility in excess of certain quantities during the preceding year. This includes gaseous, liquid, and solid chemicals designated as extremely hazardous substances in amounts greater than or equal to 500 pounds, liquids in amounts greater than or equal to 55 gallons, or amounts greater than or equal to the threshold planning quantity. It also requires reporting of all other hazardous chemicals present at the facility during the preceding calendar year in amounts equal to or greater than 10,000 pounds. Table 5.1.3: 2014 Tier II Chemical Inventory Reporting

Facility ID	Report Year	Chemical Name	CAS Number	Max. Amt.	Avg. A.
MGN	2003	HYDROGEN SULFIDE	00007783-06-4	02	02
MGN	2003	NITROGEN DIOXIDE	010010102-44-0	02	02
MGN	2003	SULFURIC ACID	0007664-93-9	03	03
MGN	2004	HYDROCHLORIC ACID	0007647-01-0	03	02
MGN	2004	SULFURIC ACID	0007664-93-9	03	03
MGN	2007	[007647-01-0]	007647-01-0	03	03
MGN	2007	[007664-93-9]	007664-93-9	03	03
MGN	2007	[007783-06-4]	007783-06-4	03	03
MGN	2007	[010102-43-9]	010102-43-9	02	02
PGH	2003	HYDROCHLORIC ACID	0007647-01-0	03	03
PGH	2004	HYDROCHLORIC ACID	0007647-01-0	03	03
PGH	2004	NITRIC OXIDE	010102-43-9	02	02
PGH	2007	[007446-09-5]	007446-09-5	03	03
PGH	2007	[007647-01-0]	007647-01-0	03	03

**Diagram 5.1.1: NETL Facility Tracking System**

lists those chemicals reported by the Morgantown site for 2014. Agencies that receive the report are West Virginia State Emergency Response Commission, the Monongalia County Local Emergency Planning Committee, and the Morgantown Fire Department.

NETL maintains, through its Facility Tracking System (see Diagram 5.1.1), an active inventory of all hazardous and extremely hazardous chemicals onsite, along with a safety data sheet for each of these substances.

NETL-Morgantown does not prepare a toxic release inventory (TRI) (Form R) because the site does not use, produce, or process any of the listed toxic materials in quantities that exceed the threshold amounts. During 2014, no releases occurred that would trigger emergency notification as required by either Emergency Planning and Community Right-to-Know Act (EPCRA) or CERCLA.

NETL has established targets for reducing the accumulation of hazardous chemicals on site. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in the laboratories, while maintaining sufficient chemical stores to complete mission-related research.

Table 5.1.3: 2014 Tier II Chemical Inventory Reporting List—Morgantown			
Chemical Name	CAS #	Avg. Amount/Max. Daily Amount (lbs)	TPQ (lbs)
Carbon dioxide	124-38-9	2,115/2,200	—
Hydrochloric Acid	7647-01-0	400/450	500
Hydrogen sulfide	7783-06-4	30/35	500
Nitrogen dioxide	7727-37-9	48,540/65,783	100

## RCRA

Under the Resource Conservation and Recovery Act (RCRA), sites are designated as generators, transporters, or treatment, storage, and disposal (TSD) facilities. Morgantown is regulated as a Large Quantity Generator under the jurisdiction of the WVDEP. Although hazardous waste generation rates are low most months, occasional laboratory activities result in the generation of larger quantities that exceed the threshold for Small Quantity Generators. See [Table 5.1.4: 2014 Hazardous Waste Generation – Morgantown](#) for summary information on waste generation and management. NETL is not a licensed transporter or TSD facility for hazardous waste, nor does it hold a permit for treatment or disposal of nonhazardous waste that would be regulated under RCRA Subtitle D. Hazardous waste may be stored onsite for no more than 90 days without a permit. In 2014, hazardous waste materials were transported to the TSD facilities of American Environmental Services, Inc., located in Calvert City, Kentucky, for ultimate disposition in accordance with regulatory requirements. Nonhazardous wastes (normal office wastes that are not recycled and cafeteria waste); as well as nonhazardous industrial wastes are transported by Republic Services of Fairmont to the Veolia E.S. Chestnut Valley L/F, Inc., landfill in McClellandtown, Pennsylvania.



**Photo 5.1.2: Morgantown  
Drum Crusher**

NETL complies with all RCRA manifest requirements by initiating documentation when hazardous wastes are shipped from the Morgantown site. The Hazardous Waste Coordinator initiates the documentation and files copies of the manifests, forms, waste profiles, and contracts.

NETL does not have an on-site program to treat hazardous waste or render it harmless; however, NETL does recycle some universal wastes as classified under RCRA. During 2014, NETL recycled batteries, fluorescent light bulbs, drums (Photo 5.1.2), and various items containing mercury.

On-site hazardous waste handling is governed by NETL Procedure 436.1-02.09, *RCRA Hazardous Waste Management*. This procedure requires laboratory workers to place their hazardous waste in labeled containers (drums, buckets, bottles) in identified areas within their laboratories known as Satellite Accumulation Areas (SAAs), where the waste awaits transport by technicians to the Hazardous Waste Accumulation Area. The trained and certified technicians who transport the waste on-site ensure that wastes are properly labeled and contained for transport to the Hazardous Waste Accumulation Area. When unidentified materials are provided for disposal, NETL sends samples to a contracted laboratory to test for RCRA hazardous characteristics (i.e., toxicity, ignitability, reactivity, and corrosiveness). The waste may be repackaged into lab packs for transportation. The hazardous waste coordinator ensures proper labeling on the waste at the time of pickup by the contracted transporter. According to the procedure, the collection occurs bimonthly, or as needed.

Training and various administrative controls, including the planning that precedes the issuance of a Safety Analysis and Review System (SARS) permit, ensures compliance with NETL Procedures. During annual inspections and during periodic walk-through inspections, ESS&H representatives visually evaluate areas of the Site for evidence of compliance with disposal practices. In addition, compliance with the Site's Industrial Wastewater permit (MUB 012), samples of wastewater discharges are analyzed monthly for metals, various organic compounds, pH, biological oxygen demand (BOD), total suspended solids (TSS), and total organic halogens (TOX). A full suite of chemical analyses are conducted annually. If anomalous readings are obtained during the monitoring of the dedicated laboratory wastewater sewer system, troubleshooting is initiated. If necessary, samples can be collected from fixture traps and drains to locate the source of the chemicals. Spill kits are provided in areas where chemicals are

handled, and floor drains are connected to the on-site pretreatment facility, where NETL staff may detain and neutralize spilled chemicals before release off site.

Morgantown accumulates its waste inside the Hazardous Waste Accumulation Area in Building 33. Extra spill protection and containment is provided by an epoxy coating on the concrete floor, which drains to fully contained sumps. The Building is constructed with blast abatement and spill containment features to minimize the potential risks of spark-induced ignition and the spread of contaminants in the event of an explosion or leak. Each waste class is stored in a separate room to minimize the chance that a leaked material could contact an incompatible substance and cause a reaction. The Hazardous Waste Coordinator ensures weekly inspections are performed and records kept of the inspections. RCRA-required worker training is mandatory for all technicians who collect and handle hazardous waste. All NETL employees take general computer-based awareness training. Employees who generate hazardous waste in the laboratories take additional, lecture-based training.

No hazardous waste ponds or underground storage tanks exist at the Morgantown site. These items were phased out in the past, and most contaminated soils associated with these items were removed. Currently, aboveground storage tanks hold gasoline, diesel fuel, ethanol, and fuel oil. The tanks holding gasoline are visually inspected weekly for leaks. Quarterly interstitial monitoring is performed on the double-walled tanks. NETL installed most of these tanks during the mid-1990s. All aboveground tanks at the Morgantown Site are compliant with WVDEP regulations.

To deal with the possibility of emergencies, the Morgantown site maintains a comprehensive emergency response system, including a hazardous materials response team. Several NETL directives specify the response to emergencies. If a spill occurs, the first person to notice the spill has the responsibility to report it immediately to site security. This will initiate an investigation and response that is proportional to the perceived potential threat or risk. NETL personnel who participate on the hazardous materials team or other response teams are trained to contain and control a spill or perform a cleanup, as warranted. Emergency response drills are conducted annually. Where needed, laboratory-specific operating procedures specify how to control and shut down various laboratory activities in the event of an emergency.

In 2014, hazardous waste management inspections continued to focus on proper control of hazardous materials within laboratory spaces. Any deficiencies were entered into Assessment Information Input System (AIIS) and appropriate actions were taken to correct these findings. The WVDEP Office of Environmental Enforcement conducted an inspection in 2013 and discovered no deficiencies or findings.

Table 5.1.4: 2014 Hazardous Waste Generation—Morgantown	
Waste Stream	Qty. Generated (lbs.)
Poison (Toxic Solids & Liquids)	189
Mercury/Mercury Compounds	0
Flammable Solids	25
Corrosive Liquids	151
Waste Oxidizers	8
Waste Paint (Oil Based)	323

Table 5.1.4: 2014 Hazardous Waste Generation—Morgantown	
Waste Stream	Qty. Generated (lbs.)
Flammable/Combustible Liquids	413
Activated Carbon	0
Other RCRA Hazardous Wastes	267
Lead Paint Debris	6
Fluorescent Light Tubes (Universal Waste)	93
Batteries (Universal Waste)	3,227
Mercury Containing Equip. (Universal Waste)	5
Corrosive Solids	41
<b>TOTAL</b>	<b>4,748</b>

## 5.2 TSCA

NETL-Morgantown does not manufacture chemicals and so is not subject to sections of the Toxic Substance Control Act (TSCA) related to manufacturing.

No unplanned releases of air pollutants covered by CERCLA or toxic release inventory (TRI) regulations occurred during 2014. Asbestiform fiber concentration air monitoring is conducted annually in Buildings 1, 2, 3, 4, 5, and 7, because asbestos-containing building materials were used in the construction of these facilities. All known friable asbestos-containing material has been removed or encapsulated. No samples taken in 2014 contained fiber concentrations in excess of U.S. Environmental Protection Agency (EPA) or the State of West Virginia clearance levels (0.01 fibers/cc). Historically, there have been occasions where fiber concentrations of samples exceeded that limit, but second-level analysis has verified every time that the excess was caused by non-asbestos fibers. The observed concentrations of asbestos fibers have always been below the clearance level.

NETL tests for lead paint before demolition projects or elimination of materials through excess property or recycling, and notifies property recipients and haulers if lead is present.

## 5.3 FIFRA

No restricted-use pesticides, herbicides, or defoliants, as regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) were kept onsite. Only general-use pesticides were kept and used for routine insect control. Professional pest control companies are subcontracted under the site support contract to spray around the base of office trailers, outside certain buildings (for example, B-1). Herbicides are not used for weed control, except for extremely limited cases. No defoliants are used.

## 5.4 Radiation Protection Program

NETL-Morgantown does not generate radioactive materials, nor does the Morgantown site transport, process, treat, store, or provide on-site disposal of radioactive waste. Radioactive materials inventory is primarily instrument test sources, as can be seen in Table 3.4.1. Sources are returned to the instrument manufacturers for disposal. Items that are not sources and that cannot be returned to the original manufacturer are retained on-site at a secure and remote location. Additional information may be found in Section 3.4 (Atomic Energy Act of 1954

[AEA]), and Section 3.3 (DOE Internal Environmental and Radiation Protection Order). No program for protection of the public and the environment from radiation hazards is needed because all radiation sources are small, sealed instrumentation sources with low-level, or very old low-level radioactive materials.

## 5.5 Air Quality and Protection Activities

The first of three environmental media protection programs is the Ambient Air Quality Program. Significant requirements and responsibilities of this program are listed in Procedure 436.1-03.01, *NETL Ambient Air Quality Management*. Under this Program, the Air Quality Manager (AQM) ensures compliance with all federal, state, and local regulations, as well as, DOE Directives. The AQM also oversees monitoring programs, permitting, and reporting. Several previous ES&H management plans (EMPs) were created focusing on various emission categories or sources where NETL can make the most improvement. To maintain quality control, NETL selects and subcontracts analytical work only to certified laboratories. These laboratories must submit their Quality Assurance/Quality Control (QA/QC) manuals to NETL for inspection, and NETL submits quality control samples (duplicates, blanks, and spikes) to the laboratories to verify the quality of the analyses. Air emissions data for the site is calculated and maintained to ensure compliance with regulatory requirements.

Several EMPs direct continuous improvement efforts in air-quality protection. For example, one EMP calls for the reduction of Scope 1 and 2 Greenhouse Gas Emissions (GHG) attributed to facility use through life-cycle, cost-effective measures by 28 percent by FY2020, relative to an FY2008 baseline (54,440,814 pounds of CO<sub>2</sub>). Another EMP requires the reduction of energy usage per square foot by 3 percent annually from 2006 through 2015 achieving a 30 percent reduction in energy use/gross square foot using FY2003 energy use data as a baseline (219,903 Btu/gsf). This EMP will reduce energy intensity in buildings to achieve GHG reductions. Finally, a third EMP annually tracks and monitors Scope 3 GHG emissions associated with employee commuting and required travel and training. NETL also has other EMPs that call for reducing petroleum-based fuels and increasing the use of alternative fuels and renewable energy to reduce NETL's impact on ambient air quality.

The WVDEP generally evaluates air quality on a county by county basis, although the regional data may be aggregated into Air Quality Control Region #6, for north central West Virginia. Monitoring is performed in Monongalia County on a daily basis at several sites, and the data is made available from the WVDEP website's air-quality index and from the EPA AirNOW webpage (<http://www.airnow.gov/>). The Morgantown site is not a significant contributor to ambient air quality issues.

In 2014, no new source reviews (i.e., Clean Air Act pre-construction reviews) occurred for any Morgantown facility, and no Morgantown facilities had the potential to emit more than 100 tons per year of any designated air pollutant.

The Morgantown site is not regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program. Nor does the site emit more than 10 tons per year of any single designated toxic air pollutant or more than 25 tons per year in aggregate of all toxic air pollutants, which would otherwise qualify it as a major source requiring regulation under the Clean Air Act for listed toxic air pollutants. The Morgantown site does not perform nuclear program work and does not have radiological emissions, which would be covered by NESHAP. The Morgantown site estimates its air emissions in quarterly and annual air emission inventories to analyze the cumulative effect of all of the projects and facilities. This analysis showed that no regulatory or other environmental impact occurred during 2014. [Table 5.5.1](#) displays the estimated 2014 Air Emissions.

Additionally, the Morgantown site maintains two small meteorological towers, one located on the roof of Building 39 (Photo 5.5.1) and the other is on the roof of Building 19 (Photo 5.5.2). The data collected at the Building 19 location includes air temperature, wind speed and direction, relative humidity, and total rainfall. The Building 39 station monitors wind speed and direction, as well as air temperature. The data is collected every second, averaged over 15 minutes, and over 24 hours to provide critical meteorological information to the Emergency Response Organization during emergency situations and provide meteorological information used in the models for the Air Emissions Program.



**Photo 5.5.1: B-39  
Meteorological Tower**



**Photo 5.5.2: B-19  
Rain Gauge**

Table 5.5.1: 2014 Air Emissions Inventory—Morgantown	
Pollutant	Estimated Emissions (lbs. /yr.)
Aldehydes	0.04048
Benzene	0.077916
Carbon Dioxide	4018741
Carbon Monoxide	5249.575
Chlorine	0.00108
Ethylbenzene	0.000577
Formaldehyde	3.2375
Nitrogen Oxide	3388.371
Particulate Matter (PM), Condensable	143.1525
Particulate Matter, Filterable	119.8345
Particulate Matter, Total	282.7539
Particulate Matter, PM <sub>10</sub> , Filterable	7.6395
Particulate Matter, Total	20.2241
Sulfur Dioxide	20.2765
Sulfur Oxides	32.2765
Toluene	0.098796
TOC	202.261
VOC	469.5799
Xylene, Mixed Isomers	0.00319

## 5.6 Water Quality and Protection Activities

NETL engages in water quality and protection activities to: (1) maintain full compliance with all applicable federal, state, and local requirements; (2) prevent spills of toxic, hazardous, or other pollutants into the environment; and (3) ensure the safety of workers and the public, and protection of the environment. These activities include management of surface water, industrial process water, and groundwater/soil.

### Surface Water Quality and Protection Program

Morgantown's Surface Water Quality Program is controlled via NETL Procedure 436.1-03.03, *Surface Water Quality Management*, which is administered by the Surface Water Quality Manager (SWQM) for the site. The procedure covers permitting and monitoring for storm water sewers and for construction-related disturbances that potentially increase sediment loads in streams. It also includes spill prevention, hazardous waste control, and emergency actions, which are addressed specifically in other procedures. The Clean Water Act and corresponding state water quality regulations require facilities generating point-source discharges, or facilities or areas discharging storm water associated with industrial activities, to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The West Virginia Division of Environmental Protection (WV DEP) has primacy over its NPDES permitting program. NETL Morgantown Site (Registration No. is **WVG610042**) is authorized to operate under WV/NPDES General Water Pollution Control Permit No. WV0111457, issued on March 3, 2014. Under this permit, the site is required to test their effluent in order to verify permit compliance; the test results are submitted to the WVDEP per the Discharge Monitoring Report (DMR). The permit also requires that Storm Water Pollution Prevention Plan (SWPPP) be developed and maintained to prevent or minimize storm water contamination.

On the developed portion of the Morgantown site, four drainage areas have rainwater runoff collection systems and regulated outfalls to the nearby surface streams:

1. Outfall 002 drains an area that holds the majority of the facilities for material handling and is approximately 509,652 square feet in area.
2. Outfall 003 receives drainage from a hillside beside B-17 and drains an area of 43,560 square feet; the permit does not require monitoring of this outfall.
3. Outfall 005 drains an area that includes B-19 (warehouse, machine shop), B-33 (hazardous materials temporary storage), and various research facilities. It drains an area of 209,088 square feet.
4. Outfall 010 (Photo 5.6.1) drains parking areas, offices, and a large section of undeveloped land; it drains an area of 3,197,304 square feet.



**Photo 5.6.1: Morgantown  
Outfall 010**

The effluent from these outfalls at the Morgantown Site are monitored according to the WV/NPDES Permit #WV0111457, and the Site's SWPPP. Per the SWPPP, designated storm water outfalls are sampled twice per year and tested for basic pollutants that can indicate contamination from site applications of fertilizer or leaking sewer lines (see Table 5.6.1). The testing results are presented in Table 5.6.2. If a spill were to occur, emergency response procedures would be activated immediately, and the appropriate outfalls would be monitored, as necessary, for the contaminants of concern.

Table 5.6.1: 2014 NPDES Permit Storm Water Monitoring Requirements—Morgantown			
Outfall	Pollutants of Concern	Low Concentration Cutoff Waiver	Frequency
002	Nitrite and nitrate	0.68 mg/L	6 month
	Fecal coli form	Report only	6 month
005	TSS	100 mg/L	6 month
	Fecal coli form	Report only	6 month
010	Biochemical oxygen demand (BOD)	30 mg/L	6 month
	TSS	100 mg/L	6 month
	Ammonia	4 mg/L	6 month
	Fecal coli form	Report only	6 month

Table 5.6.1: 2014 NPDES Permit Storm Water Monitoring Requirements—Morgantown			
Outfall	Pollutants of Concern	Low Concentration Cutoff Waiver	Frequency
	pH	9 s.u.	6 month
	Chemical oxygen demand (COD)	120 mg/L	6 month
	Oil and grease	15 mg/L	6 month

TSS = total suspended solids

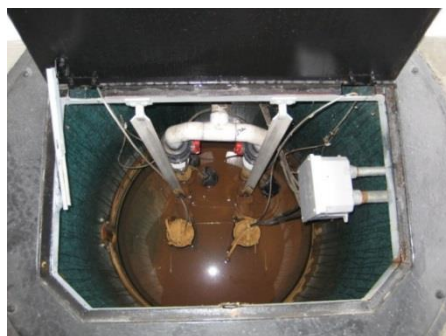
Table 5.6.2: 2014 NPDES Storm Water Analysis Results—Morgantown							
Constituents	Low Conc. Cutoff Waiver	Outfall 002		Outfall 005		Outfall 010	
		May	Nov.	May	Nov.	May	Nov.
Nitrate + Nitrite (Grab)	0.68 mg/L	2.5 mg/L	0.47 mg/L	NS	NS	NS	NS
Ammonia (Grab)	4 mg/L	NS	NS	NS	NS	0.28 mg/l	0.19 mg/l
Fecal Coli Form (Grab)	---	>2420 col/100mL	108 col/100 mL	>2420 col/100 mL	88 col/100 mL	>2420 col/100 mL	96 col/100 mL
TSS (Grab)	100 mg/L	NS	NS	34 mg/L	3.2 mg/L	46 mg/L	3.2 mg/L
BOD	30 mg/L	NS	NS	NS	NS	8.3 mg/L	ND
pH	9 s.u.	NS	NS	NS	NS	7.7 s.u.	7.7 s.u.
COD	120 mg/L	NS	NS	NS	NS	20 mg/L	ND
Oil and Grease	15 mg/L	NS	NS	NS	NS	6 mg/l	2.6 mg/l

ND = not detected; NS = not sampled; TSS = total suspended solids

Potential sources of spills of petroleum products and oils are aboveground storage tanks, oil-filled transformers and switches, a hazardous waste accumulation facility, and 55-gallon drums stored at several locations (B-5, B-19, and B-36). Five aboveground storage tanks contain petroleum products (diesel fuel and gasoline), and one contains ethanol, for a total capacity of 2,850 gallons. All storage tanks are compliance with new WV Aboveground Storage Tank regulations and all have appropriate spill control. Two of the aboveground storage tanks are located inside the area drained by Outfall 002. One storage tank is located in the drainage area of Outfall 005, and the remaining two are in the drainage area of Outfall 010. The site has 25 oil-filled transformers and two oil-filled switches, all of which have been tested for polychlorinated biphenyls (PCBs). No buried, or partially buried, storage tanks exist at the Morgantown site.

An oil-water separator, Photo 5.6.2, is installed inside the runoff collection system of the parking garage, but no other treatment systems are installed for storm water at the Morgantown site. Based on previous test results, the primary concern with surface water impacts from the site has been sediment loading. Sediment loading of surface water runoff affects Burroughs Run along the southeastern margin of the site, West Run along the northeastern margin of the Site, and a

small stream that traverses the northern portion of the site and empties into West Run. West Run is highly acidic from mine drainage located on the upper reaches of the drainage basin, and suburban development is increasing within the basin. Burroughs Run drains an area of significant urban and suburban development, which contributes typical urban/suburban pollution (e.g., oil, salt, pesticides, and herbicides).



**Photo 5.6.2: Morgantown Parking Lot Oil-Water Separator**

#### Industrial Wastewater Program

Industrial wastewater quality is controlled by NETL Procedure 436.1-02.04, *Industrial Wastewater Management*, which is administered by the industrial wastewater quality manager. Industrial wastewater is that wastewater conveyed from laboratory sinks and maintenance facilities. The industrial wastewater from all facilities at the site enters a clarifier, Photo 5.6.3, located on site, where the wastewater is sampled monthly. At the clarifier, the industrial wastewater is treated for pH, if necessary, and subsequently, the wastewater enters the site's domestic sewage lines, ultimately emptying into the municipal sewers owned and operated by the Morgantown Utility Board (MUB). This discharge is regulated under Pretreatment Permit Number MUB 012. Periodic sampling is performed, and the samples are analyzed by a laboratory chosen from a list certified by the EPA. Discharge monitoring reports (DMRs) detailing monthly sampling and analysis are provided to the MUB. Results of the DMRs for 2014 are provided in [Table 5.6.3: 2014 Wastewater Effluent Analysis \(lbs. /d\); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown](#).



**Photo 5.6.3: Morgantown Clarifier**

**Table 5.6.3: 2014 Wastewater Effluent Analysis (lbs/d);  
Pretreatment Permit, Outfall 001, One Sample/Month—Morgantown**

Parameter	Limit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Flow (MGD)													
Monthly Avg.	0.09	0.002	0.004	0.003	0.01	0.01	0.01	0.01	0.01	0.003	0.01	0.01	0.002
Daily Max.	0.15	0.006	0.01	0.010	0.02	0.02	0.02	0.04	0.03	0.01	0.02	0.03	0.01
BOD5													
Monthly Avg.	Monitor	ND	ND	0.16	0.8	75	15	0.2	4.9	2.2	0.2	ND	0.1
Daily Max.	Monitor	ND	ND	0.52	1.7	150	30	0.9	14.8	7.3	0.5	ND	0.4
TSS													
Monthly Avg.	Monitor	ND	ND	ND	0.3	0.8	0.5	0.2	1.0	0.1	0.5	ND	0.1
Daily Max.	Monitor	ND	ND	ND	0.7	1.7	1.1	0.8	3.0	0.3	1.1	ND	0.7
Arsenic													
Monthly Avg.	0.005	0.00002	ND	ND	0.00008	0.0002	0.0007	0.0006	0.0003	0.0001	0.0002	0.0002	0.00003
Daily Max.	0.008	0.00005	ND	ND	0.00017	0.0003	0.0013	0.0023	0.0010	0.0003	0.0003	0.0005	0.0002
Cadmium													
Monthly Avg.	Monitor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	Monitor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium													
Monthly Avg.	0.007	ND	ND	ND	ND	ND	0.0003	ND	ND	ND	ND	ND	ND
Daily Max.	0.011	ND	ND	ND	ND	ND	0.0007	ND	ND	ND	ND	ND	ND
Copper													
Monthly Avg.	0.04	0.0002	0.0007	0.0008	0.002	0.003	0.002	0.002	0.001	0.0003	0.003	0.005	0.001
Daily Max.	0.06	0.0005	0.002	0.003	0.003	0.005	0.003	0.007	0.003	0.001	0.005	0.015	0.006
Cyanide													
Monthly Avg.	0.02	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.03	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND	ND
Lead													
Monthly Avg.	0.025	ND	ND	ND	0.0002	ND	0.0003	ND	ND	ND	0.0001	0.0002	0.00003
Daily Max.	0.038	ND	ND	ND	0.0003	ND	0.0005	ND	ND	ND	0.0002	0.0005	0.0002
Mercury													
Monthly Avg.	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.0009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel													
Monthly Avg.	0.010	0.00003	0.00007	0.00008	0.0003	0.0004	0.0003	0.0002	0.0002	0.00005	0.0003	0.0002	0.0001
Daily Max.	0.015	0.00010	0.0002	0.0003	0.0005	0.0008	0.0007	0.0007	0.0005	0.00022	0.0005	0.0005	0.0003
Silver													
Monthly Avg.	0.011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc													
Monthly Avg.	0.2	0.0003	0.002	0.003	0.007	0.003	0.009	0.003	0.004	0.001	0.003	0.003	0.001
Daily Max.	0.3	0.0010	0.005	0.010	0.013	0.007	0.018	0.013	0.013	0.003	0.007	0.010	0.005
Iron													
Monthly Avg.	Monitor	0.004	0.010	0.014	0.06	0.03	0.08	0.03	0.13	0.005	0.04	0.03	0.01
Daily Max.	Monitor	0.013	0.026	0.048	0.11	0.05	0.17	0.11	0.38	0.018	0.09	0.10	0.07
Manganese													
Monthly Avg.	Monitor	0.001	0.006	0.004	0.008	0.11	0.06	0.01	0.07	0.01	0.01	0.01	0.003
Daily Max.	Monitor	0.004	0.015	0.013	0.015	0.22	0.11	0.03	0.20	0.02	0.03	0.02	0.02

**Table 5.6.3: 2014 Wastewater Effluent Analysis (lbs/d);  
Pretreatment Permit, Outfall 001, One Sample/Month—Morgantown**

Parameter	Limit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Phenolics													
Monthly Avg.	Monitor	ND	ND	ND	0.008	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	Monitor	ND	ND	ND	0.017	ND	ND	ND	ND	ND	ND	ND	ND
TOX													
Monthly Avg.	Monitor	0.0008	0.003	0.003	0.012	0.009	0.012	0.004	0.014	0.003	0.008	0.008	0.001
Daily Max.	Monitor	0.002	0.008	0.008	0.023	0.018	0.023	0.016	0.043	0.008	0.015	0.023	0.007
Organics													
Alachlor-1254	Report	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS
All others	Report	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS
pH (s.u.)													
Minimum	6.0	7.1	7.0	7.1	7.6	6.6	6.8	7.1	7.4	7.6	7.5	7.5	8.3
Maximum	9.0	7.8	7.8	7.8	8.0	7.5	7.7	8.0	8.3	8.1	8.3	8.7	8.7

MGD = millions of gallons per day; NS = not sampled; ND = not detected; TSS = total suspended solids; BOD5 = biological oxygen demand for 5-day period; s.u. = standard units

Per the Industrial Wastewater Management Procedure and the MUB 012 Permit, the site's monitoring activities help enforce the requirement that hazardous wastes are not permitted in the laboratory drains or other drains, except in trace quantities typically originating from washing laboratory equipment and glassware. Managers are required to provide suitable containers in laboratories for hazardous waste collection.

If hazardous materials or petroleum products accidentally spill into the sewer system, NETL must follow the emergency response and notification procedures specified by the Spill Prevention Control and Countermeasures Plan and the Groundwater Protection Plan. Hazardous waste must be handled in accordance with NETL's related procedures. If pollutant concentrations repeatedly exceed permit limits, NETL will initiate surveillance of drains and fixtures that discharge into the industrial wastewater system to identify the source.

Protection of surface water and groundwater requires the prevention of leaks from storage tanks. Accordingly, NETL instituted a program under NETL Procedure 436.1-03.03, *Surface Water Quality Management*. As required by the NPDES storm water permit, this program mandates a written spill prevention, control, and countermeasures plan (SPCC) for each site and a written operations and maintenance plan for each individual storage tank system. Every system capable of contributing to fires, explosions, emissions, or spills of hazardous materials must have written operating plans that address emergency prevention and actions to be taken should an emergency occur.



**Photo 5.6.4: Ethanol  
Storage Tank**

The program manager must identify potential spill sources on site, establish visual inspection programs, generate lessons learned (and program improvements) from past spills, and coordinate the implementation of this procedure with NETL's emergency response activities. No reportable

spills of toxic or hazardous materials occurred within the notification period (November 1996 to the present) of the current general storm water permit.

Aboveground storage tanks, such as Photo 5.6.4, are visually inspected on a weekly basis and have their interstitial cavity checked quarterly. Visible leaks are corrected immediately. Oil-filled transformers and switches are visually inspected daily. If leaked materials are observed within secondary containment or on the surrounding ground surface, the material is collected or absorbed with spill kits.

Collected contaminated soil and rainwater are disposed in accordance with regulations. Steel 55-gallon drums are stored in areas protected from rainwater and within a secondary containment. Large spill containment kits are used routinely as a means of secondary containment under the drums, and spill kits are kept nearby. The Hazardous Waste Accumulation Facility (B-33) was designed and constructed to be compatible with the materials stored there and with the conditions of storage. Leaks within this facility drain to sump areas with manual sump pumps for collection of liquids. All of the storage area of B-33 is inside, and the facility is inspected each week. No hazardous materials are conveyed through underground pipes; all aboveground pipe valves are inspected when the associated tanks are inspected. All tank-filling operations must be attended constantly, and off-site personnel are accompanied by NETL personnel when they enter the site for refueling or loading operations.

Absorbent materials are placed at the source of the spill, at any potentially affected drains, and at the entrances and exits of culverts for emergency containment. Any contaminated materials collected following a spill would be disposed in accordance with applicable regulations. Spill kits of varying types are placed at numerous locations throughout the site. Personnel and equipment are on standby to respond to spills, and emergency notification procedures are taught to the staff.

## 5.7 Groundwater and Soil Quality Protection Activities

### Groundwater and Soil Quality Protection Program

Morgantown's Groundwater Protection Program is controlled via NETL Procedure 436.1-03.02, *Groundwater Quality Management*, which is administered by the Groundwater Quality Manager (GWQM). This Procedure covers regulatory requirements and best management practices for preventing leaks and spills, monitoring groundwater and soil, removing contaminated soil, and closeout actions.

The Procedure also ensures that the Groundwater Protection Plan (GWPP) is developed and implemented to obtain data for the purpose of determining baseline conditions of groundwater quality and quantity; demonstrating compliance with and implementation of all applicable permits, regulations, and DOE orders; providing data to allow the early detection of



**Photo 5.7.1: Morgantown Monitoring Wells**

groundwater pollution or contamination; providing a reporting mechanism for detected groundwater pollution or contamination; identifying existing and potential groundwater contamination sources and maintain surveillance of these sources; and providing data upon which decisions can be made concerning land disposal practices and the management and protection of groundwater resources. The GWPP documents the Site's hydrogeology, potential sources of pollution and the associated contaminants that should be monitored, methods of well installation and sampling, a monitoring strategy, and QA/QC processes related to water/soil sample analysis.

Spills and accidental discharge cleanup procedures are also addressed in the GWPP. Should a spill occur, containment and cleanup would commence, and the affected soil would be monitored or removed, as necessary.

The primary strategy for groundwater protection is one of spill and leak prevention. Together, the NETL Spill Prevention, Control, and Countermeasures (SPCC) Plan and the Storm Water Pollution Prevention Plan lay out the strategy for minimizing the risk of unintentional releases and quickly responding to an unintentional release in an effort to minimize environmental contamination. In addition, R&D Project are only initiated or modified after a rigorous ES&H review is conducted in accordance with the SARS directives. According to these directives, the responsible person for each project must prepare a set of written procedures documenting how the project is to be operated, how waste and feedstocks are to be safeguarded, and how to contain and control unintended releases. When a leak or spill does occur and the environment is threatened, the on-site emergency response team is activated, and the facility makes the appropriate internal and regulatory-driven notifications.

Twenty active monitoring wells exist at the Morgantown site. The locations of the wells are displayed in [Figure 5.7.1: Active Monitoring Wells at the Morgantown Site](#). These wells monitor two shallow aquifers within the unconsolidated Lake Monongahela sediments and one bedrock aquifer, the Morgantown Sandstone. None of these aquifers are used as a source of water in the immediate area. [Figure 5.7.2: Generalized Cross-Section of Aquifer Units at the Morgantown Site](#) shows a generalized cross-section through the site and the relationship between the aquifers.

No groundwater contaminants have ever been consistently detected above regulatory levels at the site. Groundwater monitoring at the Morgantown site has been focused primarily on past spills and leaks and the effectiveness of the cleanup actions undertaken. The section on CERCLA [Section 5.1](#) lists the past events and the current status of these spill sites.

The only contaminants consistently found in significant amounts in the groundwater at the Morgantown site are those related to the application of salts for de-icing. Sodium chloride is applied to the parking lots and roads, and calcium chloride is applied to the sidewalks and outdoor steps. Wells located near these features and near the runoff routes from these features show significantly elevated levels of chloride compared to background levels. This impact on groundwater is a problem shared with many businesses and road maintenance activities in this region, but it is considered a necessary safety practice to prevent injuries to site personnel and visitors.

The overall groundwater monitoring strategy has been to monitor any flow coming onto the site through each aquifer and to monitor the flow after it passes beneath the facilities and moves toward the springs and seeps. Groundwater monitoring at the Morgantown site from 1993 to 2002 was driven by two reasons. The first was the mandate of the WVDEP regarding the closure of Pond 005. The second was the mandate of DOE Order 5400.1, General Environmental Protection Program. Although DOE Order 5400.1 no longer exists, samples from a large number of wells were analyzed between 1993 and 2002 for a lengthy list of analytes. This list of analytes included all organic compounds known to have been detected in analyses of the coal tar waste from the aforementioned gasifier, the Pond 005 bottom sludge, and the sampled soils beneath Pond 005. It also included metals alleged to have been present in the Stretford solution used to remove sulfur oxides in the off-gas from the gasifier. No organic compounds were consistently detected during 10 years of sampling, and no consistent indications of contaminant concentrations above the state limits have been found. Only one analyte (cadmium), traceable to the operation of the closed pond, has been detected, but not above West Virginia groundwater regulatory limits.

After more than 15 years of monitoring, groundwater conditions are well understood. Spills and leaks in the past have not significantly degraded the groundwater on site. The facilities and most of the underlying contaminated soils associated with spills and leaks in the past have been removed. In recent years, operations have changed greatly, and now few large projects could create significant groundwater contamination. At this point, most of the research is bench-scale and uses small quantities of chemicals and solvents. Accordingly, the groundwater analyses have been significantly curtailed. Under the new scheme, wells will be sampled each spring and fall. Wells located around the perimeter of the developed portion of the site in the two shallow aquifers will be tested to check water quality as it enters and leaves the developed area. For the deep aquifer (Morgantown Sandstone), sampling will continue for one up-gradient well and three down-gradient wells. The original list of measurements and analyzed compounds, which was presented in the annual site environmental reports of previous years, has been reduced to the list presented in this year's report. The results of the ground water monitoring conducted during 2014 are presented in the Appendix as [Table 5.7.1](#) through [Table 5.7.6](#).

## PITTSBURGH

### 6.1 Site Description



**Photo 6.1.1: Pittsburgh Site**

The Pittsburgh site lies within Allegheny County, Pennsylvania, at the Bruceton Research Center. The site is approximately 13 miles south of Pittsburgh, in South Park Township. It is approximately 60 miles north of the Morgantown, West Virginia, site. The facility sits within the rolling hills and steeply incised stream valleys that are tributaries of the Monongahela River. The Pittsburgh site comprises 237 acres. There are 598 employees. This includes 257 federal

employees and 341 site-support contractors. It is a partially wooded tract with two sub-sites including scattered industrial and office buildings. When the Pittsburgh site was first developed, the immediate vicinity was completely rural, however, population and housing densities have increased dramatically in recent years.

Immediately west of the site is a low ridge top with a road and houses. Another road with houses borders the north side of the site. The east side of the site is bordered by Lick Run, the Pleasant Hills Sewage Treatment Plant, and a major local road. Housing development is increasing around the boundaries of the site, especially to the southwest, where new homes overlook the site. Commercial zones are found more than three quarters of a mile away, although some small businesses are located nearby. About 40 percent of the immediately surrounding land is forested and about 25 percent is pasture or fallow field. The remainder is residential.

The Pittsburgh site focuses on technologies in scientific and engineering areas creating commercially viable solutions to national energy and environmental problems. The work is accomplished through both in-house research and development (R&D) and contracted research. The majority of NETL's projects are carried out through contracts with corporations, small business, universities, non-profit organizations, and other national laboratories and government agencies. These contracts awarded through competitive solicitation processes constitute an R&D portfolio that will return benefits to our nation for generations to come.

As of the 2010 U.S. Census, Pittsburgh's population consisted of 307,484 people and 138,739 households within the city limits. The population density was 5,521.4 per square mile. There were 156,165 housing units at an average density of 2,820.39 per square mile. The racial makeup of the city was 66.0 percent White, 26.1 percent African American, 4.4 percent Asian,

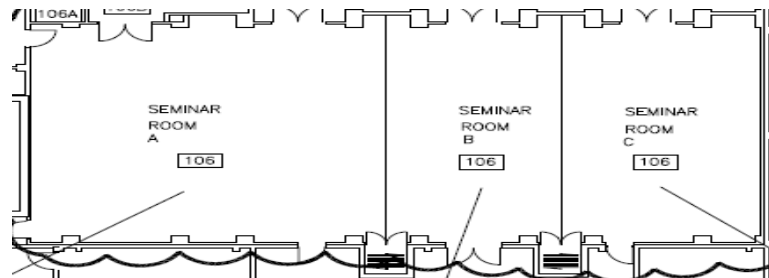
2.3 percent Hispanic or Latino of any race, 0.2 percent Native American, and 2.5 percent from two or more races.

The median income for a household in the city was \$35,732. The per capita income for the city was \$24,616. About 21.7 percent of the population was below the poverty line. The major employers within the Pittsburgh area are the University of Pittsburgh Medical Center, U.S. government, Commonwealth of Pennsylvania, University of Pittsburgh, West Penn Allegheny Health System, Giant Eagle, and Wal-Mart.

## **6.2 Major Site Activities**

### **1) B-922 Conference Room A/V System Upgrades**

The audio/visual systems in the conference facility (Rooms 106 A, B, and C) in B-922 were replaced due to their aged and outdated condition. The A/V systems were upgraded to increase system performance and capability of the conference/training rooms.



**Photo 6.2.1a: B-922  
Conference Room 106A**



**Photo 6.2.1b: B-922  
Conference Room 106B**



**Photo 6.2.1c: B-922  
Conference Room 106C**

### **2) B-83 A/V Conference Room Upgrades**

The audio/visual systems in the B-83 conference rooms, ORD Director's conference room, assembly room, and visitor's center were upgraded to make the spaces usable for tours, general meetings, and multiple-site meetings.



**Photo 6.2.2a: B-83  
Conference Room**



**Photo 6.2.2b: B-83  
Conference Room**

**3) B-920 1<sup>st</sup> Floor A/V Conference Room HVAC Corrections**

To resolve the inability of the existing HVAC system to provide sufficient cooling to the first floor audio/visual conference room, the HVAC system was replaced with additional cooling capacity. Excessive heat had been previously documented in Conference Room 107 during operation of the room's A/V equipment. Under this project, the existing Building 920 AHU 1 was replaced, the VAV box serving Room 107 was replaced, and new ductwork and diffusers were installed. These modifications allowed for more air flow into the conference room correct the overheating issues.



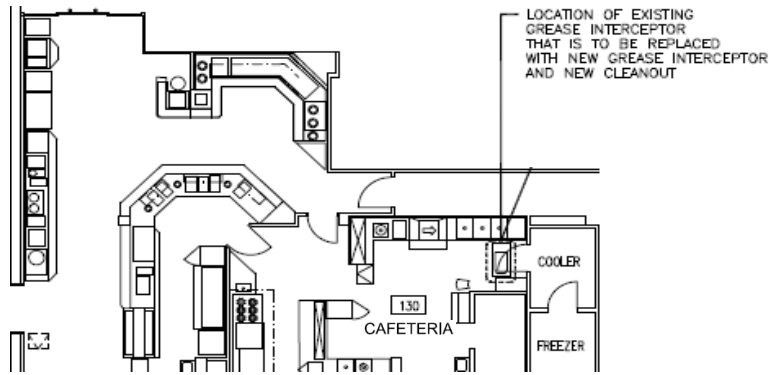
**Photo 6.2.3a: B-920 AHU 1**



**Photo 6.2.3b: B-920 AHU1  
Room 107 Conference Room (right)**

**4) B-922 Cafeteria Grease Trap**

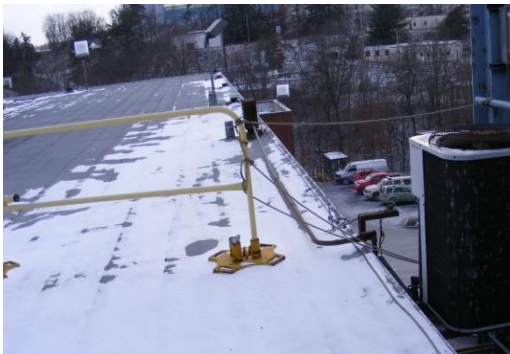
To resolve issues related to the proper disposal of grease into the sanitary sewer line, which can lead to blockages, the grease trap assembly located in the dish washing area of the cafeteria in B-922 was replaced. In addition, the outlet piping for the grease trap assembly was cleaned to rid the piping of any debris or contaminants.



**Photo 6.2.4: Location of the Grease Trap Within the Cafeteria**

## 5) B-84 Roof Fall Protection

To reduce the potential for falls from the roofing edge, a fall protection system was installed on the roof of B-84. Along with the fall protection system, a lightning protection system was also installed. The project also included modifying the roof walkways and pads to eliminate tripping hazards, modifying the steps on the north end of the annex roof to meet OSHA tread and riser standards, and painting the top step of the north stairwell with yellow/black striping to warn of uneven surfaces.



**Photos 6.2.5a and 6.2.5b: B-84 Roof Before Fall Protection System Installation**

**Photos 6.2.5c and 6.2.5d: After (right) Fall Protection System Installation**

6) **B-925 Solar Water Heating and B-922 VFDs for Hot Water Heating**

A variable flow hot water heating system and a solar water heating system were installed in B-922 and B-925, respectively, contributing to meeting energy efficiency and High Performance Sustainability Building (HPSB) targets.



**Photos 6.2.6a and 6.2.6b:  
B-922 Hot Water Piping**

**Photo 6.2.6c: B-925**

7) **B-922 Replace AHU's 2 and 8 and Boiler #4**

The upgrade of the B-922 HVAC system included the replacement of aged AHUs and a boiler that were beyond their useful life and in need of an upgrade in order to meet building HVAC and heating requirements. This project replaced AHUs 2 and 8, as well as boiler #4 with newer, more efficient units that contribute to energy efficiency and HPSB targets.



**Photo 6.2.7a: Old AHU 8**



**Photo 6.2.7b: New AHU 8**

8) **B-94 Reconfiguration (2<sup>nd</sup> , 3<sup>rd</sup> , and 4<sup>th</sup> Floors)**

The second, third, and fourth floors of B-94 underwent a renovation to update office and laboratory spaces to provide new personnel offices and meet functionality and code requirements. The reconfiguration included the demolition and cleanout of the floors followed by a build-out as a shell space including new restrooms, new supply side air system, interior painting, tiling, and epoxy coating lab floors, and installing new ceilings and lighting.



**Photos 6.2.8a and 6.2.8b: Old Laboratories and Hallways**

**Photos 6.2.8c and 6.2.8d: Compared With New Versions**

9) **B-921 HVAC Upgrades**

The HVAC system in B-921 was upgraded to meet HPSB requirements and improve building thermal and moisture control and increase energy efficiency by electrical demand load limiting. The project involved installing variable volume heating controls for the hot water, upgrading several AHUs and variable air volume (VAV) boxes, installing variable-frequency drives (VFDs), and upgrading the automatic temperature controls.



**Photo 6.2.9: B-921**

**10) B-920 HVAC Upgrades**

The HVAC system in B-920 was upgraded to meet HPSB requirements and improve building thermal and moisture control and increase energy efficiency by electrical demand load limiting. The project installed variable volume heating controls for the hot water, upgraded several AHUs and VAV boxes, installed VFDs, and upgraded the automatic temperature controls.



**Photo 6.2.10a: B-920  
Rooftop AHU**



**Photo 6.2.10b: B-920  
Rooftop AHU**

**11) B-58 AHU and VAV Controls Upgrade**

The HVAC system in Building 58 was upgraded to meet HPSB requirements and improve building thermal and moisture control and increase energy efficiency by electrical demand load limiting. The project involved installing variable volume heating controls for the hot water, upgrading several AHUs and VAV boxes, installing VFDs, and upgrading the automatic temperature controls.



**Photo 6.2.11: B-58**

**12) Site-Wide Paving**

Paving was completed for the B-141, B-900 Plateau, and B-83 areas to repair cracked and deteriorated asphalt. The work included milling, resurfacing, and line painting of the main parking lot areas and access roads.



**Photo 6.2.12a: B-900 Plateau  
Asphalt Repaving**



**Photo 6.2.12b: B-900 Plateau  
Asphalt Repaving**

**13) B-74 Roof Replacement**

The existing roof on B-74 had aged beyond its useful life and had developed leaks in a number of areas. This project involved replacing the old roof, which included removing and then returning the existing green roof plants, with a new Thermoplastic polyolefin (TPO) cool roof system. The roof parapet joints were recoated and fall protection railing was installed. This project also included landscaping the area around the northeast perimeter of the building that had become eroded, exposing foam insulation board for the building. The building's man doors were also replaced.



**Photo 6.2.13a: Old Roof**



**Photo 6.2.13b: New Roof**

**14) R&D Plateau Fire Line Replacement**

An emergency replacement of fire main at the R&D Plateau stretching from Cochrans Mill to B-59 was completed to repair several areas where the fire line had become corroded and deteriorated to the point of developing leaks and breakages at several locations.



**Photo 6.2.14a: Leaking Pipe**



**Photo 6.2.14b: Fixed With a Pipe Repair Clamp**

**15) R&D Plateau City Water Replacement and Paving Phase 2**

The existing potable water lines for the R&D Plateau were beyond 50 years old and had numerous documented past failures. This project was the second phase in replacing the potable water lines for the R&D Plateau to resolve issues related to the potential failures of the potable water supply that could impact a large majority of the office and laboratory buildings on the plateau. The new lines installed under this project completed the potable water supply loop to the entire R&D Plateau and now allow for individual buildings to be isolated without taking the entire plateau out of service.



**Photo 6.2.15a: R&D Plateau Potable Water Line Replacement**



**Photo 6.2.15b: R&D Plateau Potable Water Line Replacement**



**Photo 6.2.15c: R&D Plateau Potable Water Line Replacement**

**16) R&D Plateau Emergency Fire Protection Replacement Phase 1**

An immediate fix to the primary water supply line from NIOSH uphill to B-83 on the R&D Plateau was needed, as major leaks and line breaks occurred in rapid succession. Immediate replacement of the line was required in order to provide reliable service to the R&D Plateau, as the piping had deteriorated beyond a serviceable condition.



**Photo 6.2.16: Excavating Water Line at the Bottom of the Hill**

**17) R&D Plateau Emergency Fire Protection Replacement Phase 2**

Due to numerous recent pipe failures on the circa 1977-installed fire protection main supply lines, the lines were replaced starting from the corner at B-83, going into 83, stretching across the south parking lot, and extending northward towards B-58 and B-84. Due to the age and corroded condition of the piping, it was concluded that the only feasible solution is the replacement of the fire water line system at the R&D Plateau to ensure continued availability of fire protection water.



**Photo 6.2.17a: Replacement of Fire Protection Water Piping at the R&D Plateau**



**Photo 6.2.17b: Replacement of Fire Protection Water Piping at the R&D Plateau**

**18) B-920 Plateau fire line and valve replacement**

Work completed on the B-920 Plateau included the replacement of a section of 40+ year old piping and the replacement of an inoperable isolation valve. This project now allows for the isolation the three individual fire loops on the B-920 Plateau and eliminates the need to shut down all three buildings on the plateau. The availability of the separated fire loops enables each building and sprinkler system to be individually isolated without impacting the remainder of the sprinkler systems and fire hydrants.



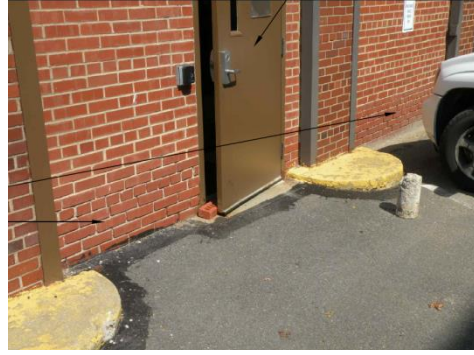
**Photo 6.2.18: B-920 Plateau**

**19) B-59 Replace Garage Doors**

Several miscellaneous repair projects were done across the site to update facility infrastructure and improve safety. One of these projects included the renovation of the B-59 east exterior wall by removing four of the existing steel rolling lift service doors and associated door system components. Two of the areas where the doors were removed were infilled with a masonry wall matching the exterior wall of the building. The other two areas had the removed doors replaced by two new insulated garage doors. In addition, the existing masonry on the east exterior wall of the building was repointed to remove and replace deteriorated mortar.



**Photo 6.2.19a: B-59  
Garage Doors**



**Photo 6.2.19b: Exterior Wall**

20) **B-84 West Gas Line**

This project included the removal of the natural gas pipe on the pipe rack northwest of B-84. The piping was removed to eliminate the safety hazards associated with the exposed gas line. Piping was rerouted through new natural gas lines in B-93, B-89, and the bunker.



**Photo 6.2.20a: Natural Gas  
Piping on Pipe Rack**



**Photo 6.2.20b: Rerouted  
Through B-93 and  
Photo 6.2.20c: B-89**



21) **B-65 and B-74 Railing**

This project was completed to improve facility safety of B-65 and B-74 by installing new removable railing on the loading docks of these buildings, which previously had open and exposed loading dock areas with potential for fall hazards. The installation of the railing helped to reduce and/or eliminate the risk of falls to a lower level.



**Photo 6.2.21a: The Open Loading Dock Areas of B-65**



**Photo 6.2.21b: B-74 Prior to Installation of Railing**

22) **B-58 Mezzanine Fire Barrier Correction**

The B-58 third floor mezzanine was enclosed with the installation of new framing, new drywall, and painting.



**Photo 6.2.22a: B-58 Mezzanine**



**Photo 6.2.22b: B-58 Mezzanine**

23) **B-901 Mezzanine Replacement**

The mezzanine located in the motor pool area of B-901 was previously installed without the design and construction guidance of in-house technicians. Inspections have shown that the structure is not capable of standard industrial loading of 125 lbs/sq ft. Therefore, the existing mezzanine was removed and replaced with an engineered structure capable of meeting industrial loading standards.



**Photo 6.2.23a: B-901 Old Mezzanine**



**Photo 6.2.23b: B-901 New Mezzanine**

24) **B-83 1<sup>st</sup> Floor Reheat**

The first floor reheat for B-83 was from an oversized boiler that was energy inefficient and detrimental to the life cycle of the boiler. The hot water supply and return piping for the first floor was reconfigured to provide reheat hot water from third floor boilers that already provide other floors. This reconfiguration allowed for the utilization of the excess capacity on the third floor and stopped the use of the first floor boiler.



**Photo 6.2.24: B-83 3rd Floor  
Boiler Room**

25) **B-903 Renovation**

B-903 was renovated to change its function from a records retention storage space to a janitorial and grounds keeping storage building.



**Photos 6.2.25a and 6.2.25b:  
B-903 Before Renovation**

**Photos 6.2.25c, 6.2.25d, and 6.2.25e: B-903 After  
Renovation**

## COMPLIANCE STATUS

### 7.1 Environmental Restoration and Waste Management

#### CERCLA

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 (40 CFR 300-310; 43 CFR 11) requires federal facilities to comply with the provisions of CERCLA and imposes an additional set of regulations related to site studies and to notices for the sale and other transfers of federal real property. Specifically, this section makes all CERCLA guidelines, rules, regulations, and criteria applicable to federally owned or operated facilities, including: (1) preliminary assessments for facilities at which hazardous substances are located; (2) possible inclusion of such facilities on the National Priority List (NPL); and (3) remedial actions at these sites. However, federal facilities are not required to comply with CERCLA provisions regarding financial responsibility and removal/remediation contracts with state governments, but federal facilities that are not on the NPL may be subject to state laws concerning removal and remediation actions. These state laws and regulations may not impose provisions more stringent than those applicable to non-federal facilities.

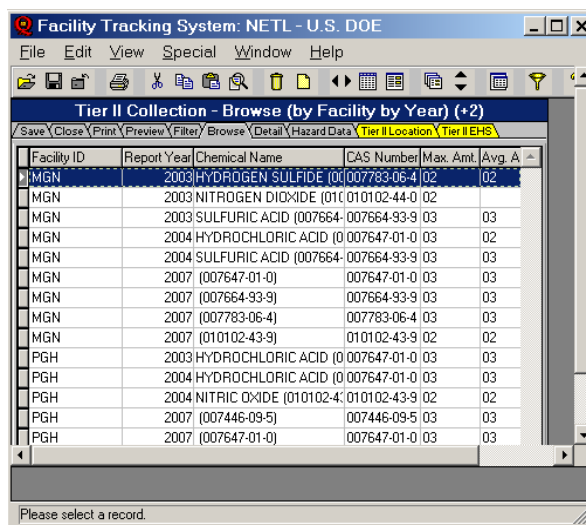
The U.S. Environmental Protection Agency (EPA) administers the CERCLA program in cooperation with the Commonwealth of Pennsylvania for the Pittsburgh site. While the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database had previously listed information about the NETL-Pittsburgh site, the site was not listed as an NPL site in 2014, or at any other time in the past. Based on soil and groundwater contamination prior to 1997, the Pittsburgh site had previously been listed as “undetermined” on EPA’s CERCLA Section 120 List. However, Pittsburgh has not been issued a further remedial action plan letter regarding this issue. According to a previous status report, remediation for areas of concern was completed in 1997. Based on sampling and analysis results, no further soil remediation was planned. It was concluded that exposure to media at the

facility is not expected to generate adverse health effects in onsite or current receptors. NETL has continued to monitor on a routine basis.

### SARA Title III

Superfund Amendments and Reauthorization Act (SARA) Title III requires the reporting of hazardous chemicals that were present at a facility in excess of certain quantities during the preceding year. This includes gaseous, liquid, and solid chemicals designated as extremely hazardous substances in amounts greater than or equal to 500 pounds, liquids in amounts greater than or equal to 55 gallons, or amounts greater than or equal to the TPQ. It also requires reporting of all other hazardous chemicals present at the facility during the preceding calendar year in amounts equal to or greater than 10,000 pounds. [Table 7.1.3:](#)

2014 Tier II Chemical Inventory Reporting List includes those chemicals reported by the Pittsburgh site for 2014. NETL maintains, through its Facility Tracking System (see Diagram 7.1.1), an active inventory of all hazardous and extremely hazardous chemicals on site, along with Safety Data Sheets (SDS) for each substance.



Facility ID	Report Year	Chemical Name	CAS Number	Max. Amt	Avg. A
MGN	2003	HYDROGEN SULFIDE	(007783-06-4)	02	02
MGN	2003	NITROGEN DIOXIDE	(01010102-44-0)	02	
MGN	2003	SULFURIC ACID	(007664-93-9)	03	03
MGN	2004	HYDROCHLORIC ACID	(007647-01-0)	03	02
MGN	2004	SULFURIC ACID	(007664-93-9)	03	03
MGN	2007	(007647-01-0)	007647-01-0	03	03
MGN	2007	(007664-93-9)	007664-93-9	03	03
MGN	2007	(007783-06-4)	007783-06-4	03	03
MGN	2007	(010102-43-9)	010102-43-9	02	02
PGH	2003	HYDROCHLORIC ACID	(007647-01-0)	03	03
PGH	2004	HYDROCHLORIC ACID	(007647-01-0)	03	03
PGH	2004	NITRIC OXIDE	(010102-43-9)	02	02
PGH	2007	(007446-09-5)	007446-09-5	03	03
PGH	2007	(007647-01-0)	007647-01-0	03	03

Diagram 7.1.1: NETL Facility Tracking System

Table 7.1.3: 2014 Tier II Chemical Inventory Reporting List-Pittsburgh			
Chemical Name	CAS #	Daily Amount (lbs.)	TPQ (lbs.)
Nitrogen, refrigerated liquid	7727-37-9	Average: 82,150 Maximum: 134,119	None
Argon, refrigerated liquid	7440-37-1	Average: 4,057 Maximum: 13,575	None
Nitric oxide	10102-43-9	Average: 224 Maximum: 224	100

The Pittsburgh site does not prepare a toxic release inventory, TRI, (Form R) because the site does not use, produce, or process any of the listed toxic materials in quantities that exceed the threshold amounts. In 2014, no releases that would trigger emergency notification, as required by either the Emergency Planning and Community Right-to-Know Act (EPCRA) or CERCLA, occurred.

Section 312 of SARA Title III requires NETL to provide an SDS to the Pennsylvania Department of Labor and Industry, the Allegheny County Department of Emergency Services, the South Park Local Emergency Planning Commission, the South Park Township Police the Library Volunteer Fire Department, and the Broughton Volunteer Fire Department for each hazardous chemical and each extremely hazardous substance that was reported for the previous year. The

Pennsylvania Emergency Response Commission, the local emergency planning commission, and the local fire departments have been advised of all materials and quantities and their locations at the Pittsburgh site.

As part of NETL's ongoing commitment to improve emergency planning under the SARA Title III Program, NETL has established targets for reducing the accumulation of hazardous chemicals on site. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in laboratories, while maintaining sufficient chemical stores to complete mission-related research.

## RCRA

Hazardous waste operations at the Pittsburgh site (see Diagram 7.1.2) complied with all applicable federal, state, and local regulations for the handling, storage, and disposal of hazardous waste in 2014. The Resource Conservation and Recovery Act (RCRA) (42 U.S. Code 6901 et seq.) is regulated through 40 CFR Parts 260-271, and the transportation of hazardous waste is regulated through 49 CFR Parts 171-179. The regulations found in 40 CFR 261, Identification and Listing of Hazardous Waste; 40 CFR 262, Standards Applicable to Generators of Hazardous Waste; and 49 CFR Parts 171-179, Department of Transportation (DOT) Hazardous Materials regulations apply to the NETL hazardous waste program. NETL Procedure 436.1-02.09, *RCRA Hazardous Waste Management*, is used to implement these regulatory requirements.

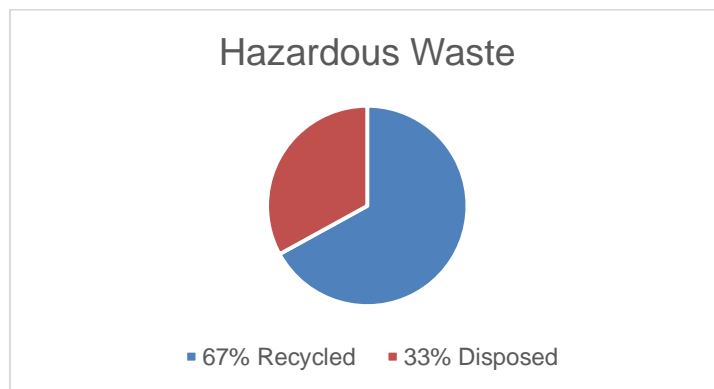


Diagram 7.1.2: Pittsburgh 2014 RCRA  
Hazardous Waste Disposition Profile

The Pennsylvania Department of Environmental Protection (PADEP) is authorized to enforce the federal and state hazardous waste management requirements at the Pittsburgh site. The hazardous waste operations personnel frequently review current waste industry newsletters and bulletins, receive information from the Alliance of Hazardous Materials Professionals, read NETL's regulatory compliance reviews, annually attend the hazardous waste operations training, and attend the hazardous materials transportation training every three years.

The Pittsburgh site is a large quantity hazardous waste generator and has an EPA Large Quantity Generator Identification Number. Although Pittsburgh generates relatively small amounts of hazardous waste during most months of the year, occasionally laboratory activities result in the generation of larger quantities that exceed the threshold for small quantity generators.

Hazardous waste is not retained on site for more than 90 days because NETL does not have a permit to store hazardous waste for a longer period of time. Most waste is shipped in laboratory packs (lab packs) containing combinations of several different compatible chemicals within a single container.

The chemical handling support staff at the Pittsburgh site is not authorized to transport hazardous waste. In 2014, American Environmental Services, Inc., (AES) transported all hazardous waste to its storage and treatment facilities. The AES facility combines small packages of similar waste and repackages the waste for more cost-effective shipment to a final disposal facility, which is selected by AES and monitored by NETL. Nonhazardous waste (normal office waste that is not being recycled and cafeteria waste) is transported to a local landfill using commercial waste disposal services.

The amount of hazardous materials and waste removed from the site remained relatively consistent with previous years. Pittsburgh generated 5,082 pounds of hazardous waste in 2014. Pittsburgh also continues to reduce its chemical footprint, as appropriate. Any items deemed unusable were disposed. See [Section 2.4](#), Environmental Objectives and Targets, for an explanation of how this quantity was established. This reduction was accomplished using a number of efforts. For example, when unused and unopened chemicals were received for disposal, they were offered to other researchers for potential use. Less hazardous or nonhazardous chemicals were substituted for requested hazardous chemicals when possible. Batteries and fluorescent bulbs were sent to recyclers. Used computers and other electronics were offered to schools, offered for sale as excess government property, or recycled via NETL's ADP (automatic data processing) scrap contract.

Liquid wastes are kept in drums. The Pittsburgh site does not have a storage or treatment pond, nor are underground storage tanks in Pittsburgh available to store petroleum or hazardous waste. No aboveground storage tanks for hazardous waste exist. Liquid acids and bases are collected monthly at satellite accumulation areas and are characterized and analyzed, if necessary. Waste handling and management personnel ensure regulatory compliance by:

- Weekly walk-through inspections of the Chemical Handling Facility.
- Monthly pickups at satellite accumulation areas.
- Battery pickups at various locations.
- Participation in the SARS process.
- Participation in ERO exercises.
- Training on hazardous waste management.
- Regulatory reviews.

- Attendance at conferences addressing hazardous waste requirements.

Pittsburgh complies with the RCRA hazardous waste manifest requirements before wastes are shipped from the site. The NETL hazardous waste coordinator initiates the documentation and coordinates the completion of the manifest with contracted transporter (AES) and the hazardous waste manager. When AES is ready to ship the waste, the manifest is again checked against the actual shipment to ensure accuracy. All information collected for the manifests, including waste generation forms, waste profiles, and contracts, is retained by the hazardous waste manager.

At Pittsburgh, hazardous waste generators have full responsibility for managing the waste that they generate from the moment of creation until it is transferred to the waste management organization. The waste generators ensure that all hazardous or potentially hazardous wastes are properly contained and identified at the point of generation. Generators are held accountable for wastes that are not properly contained or identified or are otherwise mismanaged.

Waste-handling personnel who collect the hazardous wastes first inspect the container, the labels, and the internal documentation to ensure that the wastes are properly packaged and labeled, and that the required documentation is complete and accurate. Waste-handling personnel are not permitted to accept or move any hazardous waste without proper packaging, labeling, and identification. The responsibility for identifying the waste rests primarily with the hazardous waste generator.

NETL's hazardous waste manager ensures compliance with applicable regulations by overseeing the entire hazardous waste program. Periodically, the hazardous waste manager reviews the program and brings any deficiencies to the attention of the appropriate individuals or managers, and ensures the development, accuracy, and submission of the Biennial Hazardous Waste Report to the Commonwealth of Pennsylvania, and the Pollution Prevention Tracking and Reporting System information to DOE headquarters. The hazardous waste manager also audits hazardous waste management operations, hazardous waste generators, and TSD facility subcontractors.

NETL's hazardous waste manager or trained designee signs the RCRA manifests and other relevant documentation (e.g., land disposal restriction forms, waste profiles, and bills of lading); original copy of the RCRA manifests, biennial reports, and certificates of disposal or destruction, are maintained by the hazardous waste coordinator.

The hazardous waste manager ensures that training is provided to employees who require the annual hazardous waste operations and emergency response training (HAZWOPER), so they may properly perform their duties and responsibilities. This includes instruction on the proper handling techniques and disposal methods for chemical waste (Photo 7.1.1).



**Photo 7.1.1: Glassware Crusher**

## **7.2 TSCA**

No substances regulated by the Toxic Substance Control Act (TSCA) are manufactured by NETL-Pittsburgh, and therefore, the site is not subject to TSCA reporting requirements.

Friable asbestos has been, and will be, abated when found. Non-friable asbestos present at the NETL-Pittsburgh site is inventoried and maintained. Most is contained within floor tile and floor tile mastic installed on the floors of several laboratory buildings (e.g., B-94, B-141, and B-903). The remainder is contained in roofs or laboratory furniture (B-83, B-86, B-94, and B-921). Asbestos remaining inside buildings is well encapsulated by the matrix material (e.g., floor tiles and laboratory table tops). Air monitoring has revealed no shedding of asbestos fibers. Asbestos is also found in some gaskets and inside some laboratory devices, such as muffle and tube furnaces. Asbestos is removed as part of any remodeling or reworking in a room, building, or facility where asbestos is present is handled by a licensed ARRC.

NETL tests for lead paint before demolition projects or elimination of materials through excess property, or recycling, and notifies construction or demolition crews, property recipients, and haulers if lead is present.

## **7.3 FIFRA**

No restricted-use pesticides, herbicides, or defoliants, as regulated by the FIFRA were kept on site. Only general-use pesticides were kept and used for routine insect control. Professional pest control companies are subcontracted under the site support contract to spray around the base of office trailers, outside certain buildings (B-95 and B-903), daycare facility door thresholds and window sills, and for pest control in the cafeteria. Herbicides are not used for weed control except for extremely limited cases. The only recurring use of an herbicide is for the gravel lot inside the fenced bulk gas storage area near B-900; this is a limited access area that is more than 50 feet from any regularly inhabited facility. No defoliants are used.

## **7.4 Radiation Protection Program**

Use of radioactive materials at NETL-Pittsburgh is limited to research instrumentation. The 2014 source inventory is displayed in [Table 3.4.2](#). NETL-Pittsburgh does not generate, process, or treat any radioactive material, nor does it have any temporary or permanent facility for

radioactive waste disposal on-site. An inventory of radiation sources is maintained and monitored by the radiation safety officer. Information is retained about the item, isotope, quantity, custodian, location, status, and sealed-source activity. All of the radioactive sources are sealed and are used in instrumentation. A site support contractor has the required Nuclear Regulatory Commission license for the three Ronan Engineering Company level density gauges. Pittsburgh has two sealed-source electron capture devices that are licensed through the manufacturer.

Radiation monitoring performed at Pittsburgh consisted of body thermoluminescent dosimeters and finger rings for the employees in the mail facility (mail and packages are X-rayed upon receipt). In addition, specific radiological control areas have dosimeter badges continually displayed.

No radiation leakage or exposure events occurred in 2014.

## **7.5 Air Quality and Protection Activities**

The NETL Ambient Air Quality Management Program is concerned with protection of outdoor air quality. This includes applications for air emission permits that allow NETL to conduct research into the science of reducing air emissions. The program is regulated by the Allegheny County Health Department (ACHD), which is authorized to administer Title V permits under the Clean Air Act Amendments.

The air quality program manager prepares permit applications, obtains permit renewals as needed, and oversees monitoring programs and reporting. Air emissions are reported annually in accordance with the air permit maintained at the site. On January 5, 2009, the site was issued a Title V permit designating NETL-Pittsburgh as a synthetic minor source, with a permit expiration date of January 4, 2014. (A synthetic minor is any source that has its emissions administratively limited below certain thresholds by means of a federally enforceable order, rule, or permit condition.) The renewal application was submitted to the ACHD on June 27, 2013. Several regulatory requirements are outlined in the permit that must be followed, especially an emissions inventory that is submitted to the ACHD by March 15<sup>th</sup> of each year for the preceding calendar year. The ACHD did not require the submittal of the emissions inventory for 2014.

The inventory model used by the ACHD, Bureau of Environmental Quality, and Division of Air Quality to calculate the emissions inventory is based on fuel usage and provides a worst-case scenario for potential emissions. The model takes into account the type, quantity, and total burn time of the fuel to determine the estimated emission level. The results of the modeling are summarized in [Table 7.5.1](#). Additionally, NETL must submit semi-annual reports to ACHD in accordance with General Condition III.15.d. The semi-annual report includes a pilot-scale boiler (B-003), comfort-heat boilers (B-004 through B-009), and emergency generators (EG-001 through EG-003).

Table 7.5.1: 2014 Air Emissions Inventory—Pittsburgh	
Pollutant	Estimated Emissions (lbs/yr)
Ammonia	152.1
Benzene	0.1
Butane	10.0
Carbon Dioxide	5,580,000
Carbon Monoxide	3,993.1
Hexane	0.9
Napthalene	0.03
Formaldehyde	3.6
Nitrogen Oxide	104.6
Lead	0.024
Pentane	12.4
Ethane	14.7
Methane	109.3
Particulate Matter, PM <sub>2.5</sub>	1,100.0
Particulate Matter, PM <sub>10</sub>	1,461.3
Sulfur Dioxide	28.5
Toluene	0.16
Arsenic	0.01
Barium	0.2
Cadmium	0.05
Chromium	0.07
Copper	0.04
Manganese	0.02
Mercury	0.01
Molybdenum	0.05
Nickel	0.1
Vanadium	0.1
Zinc	1.4
VOC	261.5

No Notices of Violation were received, nor were there any unplanned air emission occurrences in 2014. NETL actively participates in a program for a reduction in the use of Class I ozone-depleting substances (ODS). This program aims to recover and reclaim chlorofluorocarbon refrigerants from HVAC equipment for subsequent reuse. The inventory of ODS-containing equipment on site is steadily decreasing. Older ODS-containing equipment is being replaced, and the use of Class I ODSs are being phased out from the HVAC equipment. Systems and appliances with environmentally friendly substitutes are being used to replace the Class I ODS-containing systems and appliances.

The site maintains two 30-foot meteorological towers that monitor temperature, relative humidity, precipitation, wind speed, wind direction, barometric pressure, and solar radiation, but are not used for emissions monitoring. Data are collected for use by the site's HVAC programs and to provide critical meteorological information to the Emergency Response Organization

during emergency situations and in the models for the air emissions program. One of the two meteorological towers is shown in Photo 7.5.1.

The original towers contained obsolete communication systems, software, and sensors, and as a result, they upgraded in 2014.

## 7.6 Water Quality and Protection Activities

The topography of the Pittsburgh site consists of rolling hills separated by the natural flow of water on the site. As a result, the surface water quality and protection program is divided into two distinct areas. One area is located north of Experimental Drive and the other area is south of Wallace Road. The northern area houses the laboratory and process facilities for the DOE portion of the site, and the southern area houses administrative, project management, and contractor maintenance operations. The northern area is termed the “R&D Plateau,” and the southern area is termed the “Main Plateau.”



**Photo 7.5.1: Pittsburgh Meteorological Tower**

NETL's water quality program ensures that activities do not result in contamination of storm water, industrial wastewater, or sanitary wastewater discharges. All on-site research projects, support activities, and construction activities are reviewed by ES&H staff for potential impacts on air, surface water, groundwater, and soil as part of the SARS processes. Applicable federal, state, and local regulations affecting these activities are reviewed, and compliance is ensured before approval is given to proceed.

Laboratory wastewater from the northern portion of the site is routed to the wastewater treatment facility (WWTF) in Building 74. Industrial wastewater, consisting of laboratory and process wastewater from the site's R&D operations, is regulated by the Pleasant Hills Industrial Sewer Use Permit Program. Treatment in the wastewater treatment facility (WWTF) begins with flow equalization and then pH adjustment using either caustic soda or ferric chloride. Subsequently, metals and particulates are removed by agglomeration in the flocculation tank, coupled with solids separation in the plate separator (Photo 7.6.1). Final removal of the metals and particulates occurs in a filter press. Prior to discharge to the sanitary sewer, the treated water is sent through an activated clay/activated carbon filtration system for additional removal of organics and metals. Once through the system, if the effluent does not meet the necessary pH, it is recirculated through the system from within the effluent monitoring tank. (If the pH is outside the allowable range (6 to 9), a diverter valve opens automatically, allowing the off-specification effluent to be recirculated within the system for additional treatment to meet pH requirements.) Final effluent pH adjustment occurs in a chamber inside the effluent monitoring tank prior to discharge. WWTF effluent is then routed to the Pleasant Hills Sewage Treatment Plant for final treatment.



**Photo 7.6.1: Pittsburgh Plate Separator**

Pleasant Hills Authority (PHA) issued the current Industrial Sewer Use Permit to NETL on March 26, 2014. Permit conditions limit the quantity and quality of effluent constituents (total cyanide, mercury, copper, lead, and pH level) discharged to the PHA Treatment Plant. Wastewater analysis data for effluent discharged through the WWTF must be submitted on a semi-annual basis to the PHA's consulting engineering firm, Gannett Fleming, Inc.

[Table 7.6.1: Industrial Sewer Use Permit \(B-74\) Monitoring Analysis – Pittsburgh](#) provides the results of the 2014 wastewater analysis data collected by NETL. Although not required by the permit, NETL also routinely provides the PHA with monthly sampling analysis (see [Table 7.6.2: B-74 2014 Monthly Monitoring Results \(mg/L\)](#)). No permit limits were exceeded in 2014.

Table 7.6.1: 2014 Industrial Sewer Use Permit Monitoring Analysis—Pittsburgh					
Constituent	Total Cyanide	Copper	Mercury	Lead	pH
Permit Limit	3.21 mg/L	0.32 mg/L	0.12 mg/L	10.6 mg/L	6.0–9.0 s.u.
May 1, 2014, Sampling Date					
<b>Subinterceptor Location</b>					
Composite	0.011 mg/l	0.041 mg/l	0.00022 mg/l	0.0065	N/A
Grab #1	N/A	N/A	N/A	N/A	7.91 s.u.
Grab #2	N/A	N/A	N/A	N/A	7.89 s.u.
Grab #3	N/A	N/A	N/A	N/A	7.85 s.u.
Grab #4	N/A	N/A	N/A	N/A	7.96 s.u.
<b>B-74 Effluent</b>					
Composite	ND	0.015 mg/l	0.00083 mg/l	0.0014	N/A
Grab #1	N/A	N/A	N/A	N/A	7.54 s.u.
Grab #2	N/A	N/A	N/A	N/A	7.59 s.u.
Grab #3	N/A	N/A	N/A	N/A	7.83 s.u.
Grab #4	N/A	N/A	N/A	N/A	7.88 s.u.
October 29, 2014 Sampling Date					
<b>Subinterceptor Location</b>					
Composite	ND	0.220 mg/l	0.00044 mg/l	ND	N/A
Grab #1	N/A	N/A	N/A	N/A	7.81 s.u.
Grab #2	N/A	N/A	N/A	N/A	8.24 s.u.
Grab #3	N/A	N/A	N/A	N/A	8.16 s.u.
Grab #4	N/A	N/A	N/A	N/A	8.03 s.u.

Table 7.6.1: 2014 Industrial Sewer Use Permit Monitoring Analysis—Pittsburgh					
Constituent	Total Cyanide	Copper	Mercury	Lead	pH
<b>B-74 Effluent</b>					
Composite	ND	0.040 mg/l	ND	ND	N/A
Grab #1	N/A	N/A	N/A	N/A	7.45 s.u.
Grab #2	N/A	N/A	N/A	N/A	7.94 s.u.
Grab #3	N/A	N/A	N/A	N/A	7.84 s.u.
Grab #4	N/A	N/A	N/A	N/A	7.44 s.u.

ND=Not Detected; s.u.=standard units; N/A=Not Applicable

NETL also prepares an annual wastewater report with information about the site's industrial wastewater discharge, including the volume of wastewater discharged, the number of site employees, the type of waste discharged, and the type of pretreatment performed. In addition, the PHA independently conducts its own sampling and analysis.

Table 7.6.2: B-74 2014 Monthly Monitoring Results (mg/L)—Pittsburgh													
Constituent	Permit Limit	Sampling Date											
		1/15/14	2/13/14	3/12/14	5/1/14	5/14/14	6/18/14	7/9/14	8/13/14	9/11/14	10/29/14	11/19/14	12/10/14
Aluminum	None	0.054	0.033	0.021	0.043	0.110	0.017	0.040	0.087	0.060	0.120	0.050	0.050
Cadmium	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00024	ND	0.00016
Chromium	None	ND	ND	0.0011	ND	0.00089	ND	ND	ND	ND	0.0012	ND	ND
Copper	0.32	0.032	0.015	0.026	0.014	0.055	0.028	0.025	0.049	0.034	0.042	0.045	0.049
Cyanide Total	3.21	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0023	0.0063	0.0041
TOX	None	0.033	0.110	0.160	0.075	0.086	0.086	0.079	0.087	0.055	0.120	NA	0.13
Iron	None	0.360	0.073	0.140	0.077	0.700	1.100	0.210	0.220	0.160	0.710	0.410	0.530
Lead	10.6	ND	ND	0.0019	0.0012	ND	ND	ND	ND	0.0012	ND	0.0026	ND
Mercury	0.12	ND	ND	ND	ND	0.00009	ND	ND	0.000063	ND	ND	0.00013	0.00011
Nickel	None	0.0015	0.0030	0.0019	ND	0.0021	0.0028	0.0006	0.0012	0.00095	0.0029	0.00079	0.0019
Oil and Grease	None	2.2	4.7	ND	3.8	1.6	2.8	2.4	2.4	2.7	2.2	2.1	1.6
pH (s.u.)	6.0-9.0	8.51*	8.07*	7.82*	7.54*	8.20*	8.21*	6.91*	7.21*	7.91*	7.94*	7.69*	7.93*
Phenolics	None	0.0036	ND	ND	0.0091	0.011	0.0043	0.0049	0.0039	ND	ND	ND	0.011
TSS	None	ND	ND	ND	ND	2.4	3.6	ND	2.8	ND	ND	ND	2.0
Tin	None	ND	ND	ND	ND	0.0064	ND	ND	ND	0.0011	ND	ND	0.0011
Trichloro-methane	None	0.0013	0.00069	0.00074	0.0017	0.0012	0.0043	0.0032	0.0055	0.0015	0.0015	0.0075	0.0053
Zinc	None	0.033	0.037	0.036	0.013	0.110	0.064	0.057	0.110	0.044	0.041	0.078	0.072

ND = not detected; s.u. = standard units; TOX = total organic halogens; TSS = total suspended solids; \* = Field Measurement; NA= Not Analyzed

In addition to the sampling and analysis performed by NETL and CDC/NIOSH, the PHA conducts independent sampling and analysis of wastewater effluent from all of these locations. PHA uses this information to determine whether any discharges of the treated effluent exceeded local limits and required a Notice of Violation to be issued.

Separate from the discharge of the treated laboratory/process wastewater, sanitary sewage from the northern portion of the NETL-Pittsburgh site is combined with sanitary sewage from the Center for Disease Control/National Institute for Occupational Safety and Health (CDC/NIOSH), the other major federal agency on the site. The NETL/NIOSH sub-interceptor sanitary sewer

line then discharges into the South Park (PA) main sanitary line, at a point close to the PHA WWTF. However, the Mine Safety and Health Administration (MSHA), the third federal agency sharing the environment of the Bruceton Research Center and also located on the northern portion of the site, has a separate sanitary sewer line. MSHA sanitary sewer line discharges directly into the South Park (PA) main sanitary line. The southern portion of the Pittsburgh site does not require an industrial wastewater treatment system. The southern portion does not house laboratory operation, only administrative, project management, and contractor maintenance operations. All NETL sanitary sewage from the southern portion of the site is routed to and treated at the Clairton Municipal Sewage Treatment Plant.

NETL-Pittsburgh (as part of the Bruceton Research Center) has a National Pollutant Discharge Elimination System (NPDES) storm water permit. The permit lists three outfalls: North Outfall (001), South Outfall (002), and North Outfall Extension (101). Contaminants to the storm water effluent are regulated by this permit. Contaminant sources include a salt storage facility, air-conditioning condensate (Photo 7.6.2), runoff from various impervious surfaces into the site storm sewers, and treated acid-mine drainage from a research coal mine operated by CDC/NIOSH. NETL is required to monitor and report the results for North Outfall (001) and South Outfall (002) on a quarterly basis, although no discharge limits are mandated by the permit. [Table 7.6.3: 2014 National Pollutant Discharge Elimination System Storm Water Analysis Results—Pittsburgh](#) provides the quarterly storm water monitoring results for flow, total suspended solids, carbonaceous biochemical oxygen demand 5-day test (CBOD<sub>5</sub>), oil and grease, aluminum, iron, manganese, lead, mercury, pH, and ammonia.



**Photo 7.6.2: Pittsburgh Air  
Conditioner Condensate**

Table 7.6.3: 2014 National Pollutant Discharge Elimination System Storm Water Analysis Results—Pittsburgh				
Constituent	Sample Date			
	03/12/14	06/03/14	09/11/14	12/16/14
North Outfall—PGH				
Flow	0.622 MGD	0.447 MGD	0.249 MGD	0.769 MGD
Suspended Solids	250 mg/L	28 mg/L	16 mg/L	360 mg/L
CBOD <sub>5</sub>	4.5 mg/L	12 mg/L	5.0 mg/L	2.3 mg/L
Oil and Grease	2.0 mg/L	2.6 mg/L	3.3 mg/L	4.2 mg/L

Table 7.6.3: 2014 National Pollutant Discharge Elimination System Storm Water Analysis Results—Pittsburgh				
Constituent	Sample Date			
	03/12/14	06/03/14	09/11/14	12/16/14
<b>North Outfall—PGH</b>				
Aluminum	2.1 mg/L	0.630 mg/L	0.290 mg/L	4.4 mg/L
Iron	7.7 mg/L	2.5 mg/L	0.790 mg/L	11 mg/L
Manganese	0.380 mg/L	0.350 mg/L	0.130 mg/L	0.520 mg/L
Lead	0.014 mg/L	ND	0.0021 mg/L	0.014 mg/L
Mercury	0.00017 mg/L	0.00019 mg/L	0.00020 mg/L	0.00076 mg/L
pH	7.58 s.u.	7.29 s.u.	7.40 s.u.	7.08 s.u.
Ammonia	0.90 mg/L	0.24 mg/L	0.21 mg/L	0.39 mg/L
<b>South Outfall—PGH</b>				
Flow	1.570 MGD	0.155 MGD	0.309 MGD	1.214 MGD
Suspended Solids	320 mg/L	40 mg/L	14 mg/L	95 mg/L
Aluminum	3.8 mg/L	3.6 mg/L	2.0 mg/L	1.8 mg/L
Iron	4.6 mg/L	0.900 mg/L	0.500 mg/L	2.4 mg/L
Manganese	0.250 mg/L	0.460 mg/L	0.150 mg/L	0.140 mg/L
Lead	0.013 mg/L	ND	0.0015 mg/L	0.0033 mg/L
pH	7.16 s.u.	7.06 s.u.	7.17 s.u.	6.82 s.u.
Ammonia	0.39 mg/L	0.38 mg/L	0.22 mg/L	0.27 mg/L
Mercury	NS	NS	NS	NS

NS = Not sampled MGD= Millions of gallons per day s.u.= Standard Units ND= Not Detected

On the northern portion of the NETL site, storm water (surface water) runoff from the 69-acre area exits the site through the northern storm drainage system, which drains directly into nearby Lick Run. (Lick Run is a small natural stream that flows along the eastern boundary of the 238-acre Bruceton Research Center.) This discharge occurs at the NPDES-permitted North Outfall (001). Likewise, the North Outfall Extension (101) also discharges directly into the North Outfall. This discharge is also regulated through an NPDES permit issued to all three agencies: NETL, NIOSH, and MSHA. NIOSH performs the sampling for this outfall and issues a monthly Discharge Monitoring Report, which monitors pH, flow, total suspended solids, manganese, and iron.

Storm water collected from the southern portion of the NETL site exits through a dedicated southern drainage system, which also enters Lick Run. This discharge occurs at NPDES-permitted South Outfall (002). Storm water discharged from the southern side of the site is regulated through an NPDES permit issued only to NETL. The South Outfall receives storm water from both NETL and NIOSH. ([Table 7.6.3](#) provides the storm water South Outfall monitoring results for flow, total suspended solids, aluminum, iron, manganese, lead, pH, and ammonia.)

## 7.7 Groundwater and Soil Quality Protection Activities

### Groundwater and Soil Quality Protection Activities

The Pittsburgh site (see [Figure 7.7.1: Topographic Site Map – Pittsburgh](#)) is located within the Appalachian Plateau physiographic province. The topography, consisting of rolling hills and ridges, reflects the dendritic drainage erosion of the uplifted Allegheny Peneplain.

All rocks in the area are of sedimentary origin. They are almost exclusively of Pennsylvanian or Permian Age, with the exception of alluvium in the stream and river valleys, which is of Quaternary Age. At the Bruceton location, bedrock is of Pennsylvanian Age and belongs to the Monongahela and Conemaugh Groups. The contact is identified by the Pittsburgh Coal, which is the basal member of the Monongahela Group (see [Figure 7.7.2: General Geologic Column – Pittsburgh](#)).

The shallowest aquifer on NETL property is found in the weathered bedrock just below the rock/soil contact and occurs over most of the site, except where it is undermined. Recharge of this unit occurs where rainfall percolates downward into the weathered strata until a continuous horizon of low vertical permeability (unweathered bedrock) is encountered. A total of 19 wells are screened in shallow weathered bedrock; seven are located in the R&D Plateau area, and 12 are in the Valley Fill area. [Figure 7.7.3: Groundwater Management Program R&D Plateau Well Locations – Pittsburgh](#) and [Figure 7.7.4: Groundwater Management Program Valley Fill Well Locations – Pittsburgh](#) show the locations of the monitoring wells.

A deeper, water-bearing zone has been noted at the contact between the Connellsville Sandstone and the Clarksburg Clay and Limestone. A total of four wells are screened in this deeper zone (located in the Main Plateau area). This deeper aquifer had extremely low yield in the Valley Fill area.

Four wells (two at the Main Plateau and two in the Valley Fill area) were originally screened in the depth interval between the two aquifers, within fractured strata. These wells had extremely low yields and were subsequently abandoned. The minimal amount of groundwater occurring in this intermediate zone is probably the result of leakage from the overlying shallow, weathered bedrock zone.

The Lick Run Valley, which borders the eastern edge of the Pittsburgh site, is made up of silt and sand alluvial deposits. The alluvial deposits comprise a water-bearing unit, which discharges to form the stream base flow within Lick Run. Although shallow piezometers have been established in these deposits, the thickness of this water-bearing unit is unknown.

The vast majority of domestic water supplies for the area surrounding the Pittsburgh site are provided by the Pennsylvania American Water Company, which processes water from the Monongahela River. However, at least one groundwater well is listed for domestic usage within a one-mile radius of the site. This well, situated near central Bruceton, is 140 feet deep and was completed in the Monongahela Group, according to the computerized PADEP Water Well Inventory. Topographic review of the well's location, based on reported longitude and latitude, as well as the reported well depth, indicate that this well was possibly completed in the Conemaugh Group. The well is located to the north of the Pittsburgh site, and it should not be affected by NETL groundwater impacts, because groundwater is assumed to flow in a southerly direction beneath the Lick Run Valley.

A water well also exists on Piney Fork Road, approximately 1½ miles south of NETL-Pittsburgh. This well was recently included in the Water Well Inventory. It is associated with a landfill. The PADEP Water Well Inventory reported no other domestic wells in Jefferson

Borough or South Park Township, however, the inventory does not list wells drilled prior to 1966.

The Pittsburgh site has two groundwater flow patterns. Groundwater flowing in the shallow, weathered bedrock aquifer may percolate along the soil/bedrock interface and/or along near-vertical stress relief fractures and follows the general site topography, flowing from the tops of hills on the site and generally perpendicular to ground surface elevation contours. This flow is directed by the intervening valleys toward the Lick Run Valley, where it joins the water-bearing unit located in the valley and adds to the base flow of Lick Run itself, Photo 7.7.1. Some of this flow also discharges as springs on the hillsides or in the valleys.



**Photo 7.7.1: Lick Run**

The second flow pattern is associated with the deeper aquifer. Groundwater in this zone generally flows east toward the Lick Run Valley, where it comes together with water of the shallow zone as it flows off the hillsides.

The primary objective of the Groundwater Monitoring Program (GMP) is to monitor the shallow, weathered bedrock zone as the first significant aquifer or water-bearing unit beneath the Pittsburgh facilities of NETL. Contamination entering the ground from soil surface sources would be expected to impact this zone first and foremost; hence, the majority of wells are placed in this zone. The GMP also monitors the wells screened in the deeper water-bearing zone to provide data on water quality and contaminant migration.

Another goal of the monitoring program is to identify and characterize groundwater flow and relate it to surface water flow conditions to better evaluate potential environmental effects of any groundwater contamination.

By properly characterizing local groundwater conditions, it is possible to ensure that potential contamination and potential contaminant migration routes have been suitably identified and investigated. This enables the groundwater program manager to be cognizant of potential continuing contamination and to remediate these contamination sources if warranted.

Groundwater monitoring (Photo 7.7.2) in 2014 was performed according to the NETL-Pittsburgh 2014 Groundwater Detection Monitoring Plan. The results of the NETL-Pittsburgh Groundwater Detection Monitoring Program are presented in [Tables 8.7.1](#) through [8.7.8](#). The results were compared against federal and state standards for groundwater.



**Photo 7.7.2: Pittsburgh Groundwater Monitoring**

The following is a summary of the groundwater monitoring results: Well VFW-3 exceeded the state drinking water primary Maximum Contaminant Level (MCL) and the EPA's Region III Risk-Based Table for tetrachloroethene. Well VFW-3 is located adjacent to a laboratory wastewater holding tank, which the overflow was connected to a French drain; the overflow was connected to the sanitary sewer more than twenty-five years ago.

- Well MPW-8 exceeded the EPA's Region III Risk-Based Table for 1, 1-dichloroethane. This well is near a previously removed underground gasoline storage tank.
- Well MPW-11 exceeded the EPA's Region III Risk-Based Table for chloroform.
- In 13 wells, iron exceeded Pennsylvania's Secondary Drinking Water MCL and Act 2 Secondary MCL standards.
- For five wells, iron exceeded EPA's Region III Risk-Based Table, Pennsylvania's Secondary Drinking Water MCL, and Act 2 Secondary MCL.
- For eight wells, manganese exceeded Pennsylvania's Secondary Drinking Water MCL and Act 2 Secondary MCL standards.
- For nine wells, manganese also exceeded EPA's Region III Risk-Based Table, Pennsylvania's Secondary Drinking Water MCL, and Act 2 Secondary MCL.

- For ten wells, aluminum exceeded Pennsylvania's Secondary Drinking Water MCL and Act 2 Secondary MCL standards.
- For six wells, sulfate exceeded Pennsylvania's Secondary Drinking Water MCL and Act 2 Secondary MCL standards. These exceedances have been attributed to past mining activities.
- For nine wells, Nickel exceeded the EPA's Region III Risk-Based Table. In the past, this level has been attributed to the interaction of the sodium and chloride with the stainless-steel well casings.
- Well MPW-10 exceeded Pennsylvania's Secondary Drinking Water MCL standards for pH.

Statistical analysis was conducted on the indicators of groundwater contamination [pH, specific conductance, total organic carbon (TOC), and total organic halogens (TOX)] of 19 NETL-PGH Groundwater Monitoring Wells on the 2014 monitoring data using the tolerance interval-two tailed method. The analysis compared the upgradient wells to the downgradient wells. The upgradient wells are MPW-1, VFW-2, and VFW-10. The results of the statistical analysis for pH showed that wells MPW-10 and VFW-6 were outside of the background tolerance intervals. The results of the statistical analysis for specific conductance showed that wells MPW-2, MPW-8, VFW-7, and VFW-14 were outside of the upper tolerance limit. The results of the statistical analysis for both TOC and TOX showed that no wells were outside of the upper tolerance limit.

Monthly groundwater elevation measurements to determine contaminant transport were completed in accordance with the Groundwater Protection Management Program. The elevations are consistent with the general groundwater flow patterns described previously.

Another element of the Groundwater Protection Program is the surface water-groundwater interaction. Each month one piezometer was monitored along Lick Run upstream of the site. A second piezometer was monitored weekly along Lick Run, adjacent to the site. These piezometers were monitored to determine if Lick Run is a gaining or losing stream, Photo 7.7.3 -- a gaining stream has groundwater flowing to the stream, while a losing stream has surface water flowing to the groundwater. The data indicates that Lick Run, upstream of the site, is a gaining stream for eight out of the 12 months, while Lick Run adjacent to the site is always a gaining stream.



**Photo 7.7.3: Pittsburgh Piezometers**

## ALBANY

### 8.1 Site Description

The Albany, Oregon, site is located in both Benton and Linn Counties in the western part of the state, Photo 8.1.1. Albany is the county seat of Linn County, and is located approximately 45 miles north of Eugene, 70 miles south of Portland, and 25 miles south of Salem.



**Photo 8.1.1: Albany Site**

Geographically, the facility is located in the Willamette Lowland, which is structural and erosional lowland between the uplifted marine rocks of the Coast Range and the volcanic rocks of the Cascade Range. The Albany site covers approximately 42 acres and approximately 248,000 square feet of building working area. The site is relatively flat, located on a higher section of town, away from any flood plains. The Calapooia River is located west of the laboratory, flowing in a broad arcuate pattern from southeast of the laboratory, around the laboratory on the west to north of the laboratory, where it flows into the Willamette River. Immediately surrounding the Albany site, the land use is a combination of residential housing developments, small businesses, and public school properties. There are 141 employees at the Albany site, including 48 federal employees and 93 contractors.

The Albany site, formerly known as the Albany Research Center, is a materials research laboratory. The research addresses fundamental mechanisms and processes; melting, casting, and fabrication of materials (up to one ton); charac-

terization of chemical and physical properties of materials; and dealing with the waste and byproducts of materials processes. As of the 2010 census, 50,158 people and 18,164 households occupied the city. The population density was 2,860.1 per square mile. There were 20,979 housing units at an average density of 1,198.8 per square mile. The racial makeup of the city was 87.8 percent White, 11.4 percent Hispanic or Latino of any race, 1.2 percent Native American, 1.4 percent Asian, 0.7 percent African American, 0.2 percent Pacific Islander, and 3.6 percent from two or more races.

The median income for a household in the city was \$45,390. The per capita income for the city was \$22,230. About 15.5 percent of the population was below the poverty line. The major employers in Albany are Samaritan Health Services, Allvac-Oremet-Wah Chang Metals, Linn Benton Community College, Greater Albany Public Schools, and Linn County.

## 8.2 Major Site Activities

### 1) B-17 Roof Replacement and Painting

The roof of B-17 was replaced due to its aged and degraded condition. The roof replacement was performed to prevent water pooling and infiltration which could potentially lead to interior damage. The exterior of the building was painted to prevent water infiltration and improve the overall condition and integrity of the building.



**Photo 8.2.1a: B-17 Before**



**Photo 8.2.1b: B-17 After**

### 2) Site-Wide Electric Utility Meters

This project included the installation of site-wide electric utility meters in several buildings to monitor power consumption as part of an ongoing site-wide energy monitoring effort. These meters measure and record energy use data through a utility monitoring system to benchmark to meet compliance requirements with DOE Order 430.2, E.O. 13423, EPACT 2005, and EISA 2007. The project included the installation of new metering devices; merging existing metering devices into the system; installation of communications hardware and software; installation of all required conduit, wire runs, and terminations; and testing and on-site start-up/commissioning of the monitoring system.



**Photo 8.2.2a: Electric Utility Meters**



**Photo 8.2.2b: Electric Utility Meters**

3) **B-29 through B-33 External Electrical Upgrades**

Electrical upgrades were completed to provide capacity requirements for expected laboratory renovations and research program requirements, and to ensure code compliance with appropriate protection and electrical grounding and isolation measures the targeted buildings and the associated external electrical infrastructure varied between 30 and 50 years old, making the upgrades a necessity in order to meet National Electric Code (NEC) requirements. The project replaced antiquated and failing electrical distribution infrastructure with modern equipment correctly sized for research operations. External electrical upgrade project was a preparatory to a subsequent upgrade of the internal electrical infrastructure of these buildings.



**Photo 8.2.1a: B-29**



**Photo 8.2.1b: B-30**



**Photo 8.2.1c: B-31**

4) **B-4, Rooms 107 and 108 Repair and Lead-Based Paint Abatement**

Walls in rooms 107 and 108 of B-4 were in significant disrepair with plaster breaking apart and paint peeling, which could lead to decreased structural integrity. Due to the damaged paint being lead-based, the project required lead-based paint abatement as part of the repair work to minimize exposure.



**Photo 8.2.4: B-4**

5) **B-4 Roof Replacement**

The roof for B-4 was replaced due to its aged condition which could eventually lead to damage of the building's interior. Replacement of the roof reduced the potential for water pooling and infiltration to improve the building integrity.

6) **B-4 Ventilation Upgrade**

Additional ventilation was required for the industrial lab spaces in B-4 to meet American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) requirements for providing air changes for heat mitigation. Active roof blowers were installed to provide required air changes in specific industrial laboratory areas.

7) **B-33 Ground Floor Renovation Design**

A design was completed for the renovation of the ground floor of B-33 to allow for the relocation of the server room and library from B-1. Planned renovations are designed to include electrical upgrades, structural modifications, HVAC upgrades, and communication upgrades for the building.



**Photos 8.2.5a and 8.2.5b: B-33**



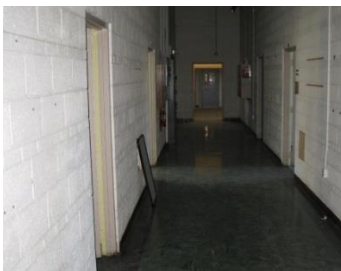
**Photo 8.2.5c: B-33**

8) **B-31 Laboratory Renovation Phase 1 Design**

A design for the renovation of the B-31 laboratories was completed for the update of the facilities and ensure they meet desired use requirements. The design includes the overall renovation to provide appropriate code and capacity compliant laboratories. Planned major work includes interior painting, replacement of suspended ceilings, removal of unused panel boards from the electrical room, replacement of the heating system, installation of fire-rated doors, and installation of HVAC and hood exhaust systems.



**Photo 8.2.6a: B-31**



**Photo 8.2.6b: B-31**



**Photo 8.2.6c: B-31**

## **COMPLIANCE STATUS**

### **9.1 Environmental Restoration and Waste Management**

#### **CERCLA**

The Albany site had no off-site remediation activities in 2014. There were no National Priorities List sites for which the Albany site had liability under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA).

#### **SARA Title III**

The Albany site does not use, produce, process, or store hazardous materials in excess of threshold quantities that would trigger Emergency Planning and Community Right-to-Know Act reporting. Therefore, TRI reporting (Sec. 313) is not necessary. However, emergency response planning has been implemented at the site, which utilizes and maintains an electronic chemical inventory and SDS database to aid in the efficient use and storage of chemicals, and for worker safety and knowledge. Efforts are underway to minimize risk associated with potential off-site receptors, including modeling potential gas releases and evaluating the continued need for propane tanks (based on evaluation of high-risk scenarios).

No on-site CERCLA/SARA cleanups took place at the Albany site in 2014. No releases occurred that would trigger reporting to DOE Headquarters Emergency Operations Center, the U.S. Coast Guard National Response Center, or any other governmental agency.

#### **RCRA**

In 2014, a piece of heavy equipment used by the on-site grounds maintenance crew was identified as leaking hydraulic fluid. The unit was immediately removed and the soil contamination cleaned up. One 55-gallon drum of contaminated soil was removed and disposed of as nonhazardous waste according to the Resource Conservation and Recovery Act (RCRA), as well as Oregon Department of Environmental Quality (ODEQ) cleanup levels.

There were no U.S. Environmental Protection Agency (EPA) compliance issue in 2014. However ODEQ performed an unannounced hazardous waste inspection at the Albany site in

2014. There were no Notices of Violation, corrective actions, or best management practices associated with the inspection or operations in 2014. The Albany site maintains an active groundwater monitoring program to monitor conditions from research conducted in the 1980s.

## 9.2 NEPA

Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. In 2014, all funded projects at the Albany site were determined to be categorically excluded.

## 9.3 TSCA

No spills or releases of substances regulated by the Toxic Substances Control Act (TSCA) of 1976 (with amendments, et. seq.) – including pesticides, polychlorinated biphenyls (PCBs), formaldehyde, methylene chloride, asbestos, etc. – were reported in 2014 at the Albany site.

## 9.4 Radiation Protection Program

X-ray generating devices are used for analytical applications at the Albany site, including scanning and transmission electron microscopes, X-ray diffraction and fluorescence instruments, and a particle-size analyzer. [Table 9.4.1](#) lists the X-ray radiation generating devices at the Albany site. All of these devices are examined annually for leaks and safety interlocks/controls to ensure employee safety; a dosimetry program is in place for to check for employee exposures. No new radioactive materials are brought to the site; however, minor amounts of legacy items remain stored in the B- 28 hot cell and other controlled locations across the site awaiting disposal. The site maintains an active site-use permit with the State of Washington–Department of Health that allows for the disposal of low-level radioactive wastes (LLRW) at the regional waste handling facility, US Ecology Washington. There were no LLRW disposal shipments performed in 2014.

Table 9.4.1: 2014 Albany X-Ray Radiation Generating Devices		
Device	Quantity	Location
X-Ray Florescence Instrument	1	B-1, Room 101
X-Ray Diffraction Instrument	2	B-1, Rooms 105 & 115
Scanning Electron Microscope	2	B-1, Rooms 109 & 119
Transmission Electron Microscope	1	B-1, Room 102
Mail X-Ray Instrument	1	B-22, Room 123
Sedigraph/Particle Analyzer	1	Not currently permitted or operated (in storage in B-36)

## 9.5 Laser Program

The Albany site uses Class 1 lasers in common office devices, including laser pointers, compact disk readers within personal computers, and fiber-optic communication lines. These lasers are built into commercial devices that protect the consumer through engineering design. Staff members also have laser pointers and other equipment that are either Class 2 or Class 3, but these have been approved with appropriate engineering controls via the Safety Analysis and Review

System (SARS) process. Since the common lasers currently used at the Albany site are less powerful (e.g., no Class 4 lasers), the minor laser safety program implemented at the Albany site adequately protects personnel from laser hazards.

## 9.6 Air Quality and Protection Activities

Albany has no emissions that require monitoring, reporting, or permitting based on current operations. In 2014 there were no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Albany site. Operation of the Albany site does not contribute significantly to any emissions under the National Ambient Air Quality Standards (NAAQS). No Albany facilities or projects are regulated under the National Emission Standards for Hazardous Air Pollutants. No Albany facilities and/or projects have the potential to emit more than 10 tons per year of a single designated toxic air pollutant or more than 25 tons per year in aggregate of all toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants. [Table 9.6.1](#) displays the estimated 2014 Air Emissions.

Ozone-depleting substances (ODSs) or refrigerants are used for air conditioning, refrigeration, chilling, or for protection of sensitive electrical systems. A list of existing ODSs is maintained and they are being replaced with more environmentally friendly units on a continual basis, whenever practicable.

Table 9.6.1: 2014 Air Emissions Inventory—Albany	
Pollutant	Estimated Emissions (lbs./yr.)
Volatile Organic Compounds	12.99
Nitrogen Oxide	233.79
Carbon Monoxide	196.49
Sulfur Dioxide	1.41
Total Suspended Particulates	173.01
Particulate Matter 10 (PM <sub>10</sub> )	28.75

## 9.7 Water Quality and Protection Activities

Albany holds a wastewater discharge permit with the City of Albany, which was last renewed in 2014 on a four-year renewal cycle. Quarterly monitoring is required in accordance with the permit. [Table 9.7.1](#) provides the results of the 2014 monitoring; all results were within permit limits. In addition, Albany has filed a slug discharge control plan with the city, which must be renewed every two years; an update is due March 15, 2015. As part of the B-26 renovation project, an elementary neutralization system (Photo 9.7) was added to perform basic pH treatment of laboratory wastes. Albany holds no storm water permit, since regulation is augmented by the city through the wastewater permit. Albany site activities in 2014 resulted in no unplanned releases, leaks, or spills that required reporting to governmental agencies.



**Photo 9.7: Elementary Neutralization System**

Table 9.7.1: 2014 Industrial Wastewater Discharge Permit Monitoring Analysis—Albany					
Constituent	Permit Limits	Sample Date			
		01/10/14	04/11/14	07/11/14	10/03/14
Arsenic	1.0 mg/l	ND	ND	ND	ND
Cadmium	0.6 mg/l	ND	ND	ND	ND
Chromium	2.8 mg/l	0.0016 mg/l	ND	ND	0.00429 mg/l
Copper	3.4 mg/l	0.0124 mg/l	0.0058 mg/l	0.0061 mg/l	0.0392 mg/l
Cyanide (Total)	1.2 mg/l	ND	ND	ND	ND
Lead	0.7 mg/l	0.0030 mg/l	ND	ND	0.00930 mg/l
Mercury	0.08 mg/l	ND	ND	ND	0.000458 mg/l
Molybdenum	4.0 mg/l	0.0023 mg/l	0.0024 mg/l	ND	0.00200 mg/l
Nickel	1.6 mg/l	0.0079 mg/l	0.0028 mg/l	0.0023 mg/l	0.00682 mg/l
Selenium	3.0 mg/l	ND	ND	ND	ND
Silver	1.1 mg/l	ND	ND	ND	0.00131 mg/l
Zinc	2.6 mg/l	0.020 mg/l	0.050 mg/l	0.038 mg/l	0.128 mg/l
pH	6.0–10.0 s.u.	7.11 s.u.	6.69 s.u.	7.14 s.u.	6.91 s.u.

## 9.8 Executive Orders and DOE Orders

### **E.O. 13423—*Strengthening Federal Environmental, Energy, and Transportation Management* and E.O. 13514—*Federal Leadership in Environmental, Energy, and Economic Performance***

Executive Orders 13423 and 13514 require Albany to ensure that all necessary actions are taken to integrate environmental, safety, and health accountability with day-to-day decision making and long-term planning processes across all agency missions, activities, and functions. Consequently, environmental management considerations are a fundamental and integral component of Albany operations, planning, and management. Albany, like the rest of the sites, achieves this

requirement through NETL's ES&H management system (ES&HMS). NETL ensures that strategies support environmental, safety, and health leadership programs, policies, and procedures, and that senior-level managers explicitly and actively endorse these strategies. The goals of the two executive orders have become the cornerstone of NETL's ES&HMS. NETL has considered the requirements of these orders when developing its list of ES&H Significant Aspects, its Objectives and Targets, and ultimately, the associated ES&H Management Plans. For more specific information, please refer to [Section 3.2, E.O. 13423 and E.O. 13514](#).

The Albany site underwent a recertification audit for ISO 14001:2004 and a certification audit for OHSAS 18001:2007 in August 2010. These certifications were maintained through 2012 as verified by internal and external audits. The Albany site underwent an ISO 14001/OHSAS 18001 Recertification Audit (September 5-6, 2013) by Orion Registrar, Inc., and a surveillance audit was conducted July 15, 2014. In addition, two internal audits of the ES&H Management System were conducted in 2014: March 5, 2014 and September 12, 2014.

### **DOE Order 435.1—Radioactive Waste Management**

The small amount of radioactive waste on the site is a result of historic operations and is managed under the program described in [Section 9.4](#): Radiation Protection.

## **9.9 Groundwater and Soil Quality Protection Activities**

In 2001, Albany initiated a groundwater protection and monitoring program in accordance with DOE requirements. The program follows the Oregon Department of Environmental Quality (DEQ) Voluntary Cleanup Program, with regulatory input from Oregon DEQ. Albany installed 14 monitoring wells on site in July 2002, and sampled the wells for a broad range of contaminants, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, nitrates, and PCBs.

Albany also screened for pesticides, herbicides, dioxins, and radiological constituents from a selected subset of the wells. Initial periodic sampling showed concern over elevated levels of VOCs, metals, and radiological constituents. This necessitated continued periodic monitoring. Subsequent periodic monitoring events have shown excessive turbidity of samples directly influencing metals and radiological results. A review of sampling protocols was undertaken and a requirement was established for future collection of groundwater samples to be performed using EPA low-stress protocols. Upon implementing the sampling protocols in 2003, metal and radiological contaminant levels in groundwater were found to be at or near background levels for the Willamette Valley in Oregon.

VOC detections during periodic monitoring prompted Albany to further investigate areas of suspected contamination, with planning efforts starting in September 2004 and on-site work initiated in January 2005. Results from samples taken in February 2005 showed contaminants of potential concern (COPCs) were likely crossing the eastern boundary of the site and migrating toward Liberty Elementary School. After meeting with Oregon DEQ and the Greater Albany Public School District personnel, investigations were made on site and off site during March-December 2005. Results of the site investigation showed no concern over surface soils, subsurface

soils, soil gas, or ambient air at off-site properties. The only concern identified was with elevated levels of COPCs in groundwater, including trichloroethene (TCE), carbon tetrachloride, and chloroform. Additional monitoring wells have been installed over the years to better delineate the groundwater investigation both on site and off site at Liberty Elementary School property, adjacent to the site (see [Figure 9.8.1](#) for well locations). The results of the 2014 monitoring program are presented in [Tables 9.8.1–9.8.8](#).

Oregon DEQ sampled residential wells within an approximate two-block radius of the site due to resident concerns voiced at town hall meetings and further reviews of the sampling results. A total of 31 residential wells were sampled, with some residential wells (including some used as drinking water) showing elevated levels of COPCs. NETL has connected all owners of impacted wells that were used for drinking water (10) to City of Albany potable water supplies. NETL has also properly closed any wells that residents requested to be abandoned per ODEQ requirements. Albany continues its site investigation activities, periodic monitoring, and remedial actions in accordance with Oregon DEQ requirements, and will evaluate and pursue actions to protect human health and the environment by eliminating risk and minimizing potential exposures. A conceptual site model has been updated for the Albany site.

#### **9.10 FIFRA**

No restricted-use pesticides, herbicides, or defoliantes were kept or used at the Albany site during 2014. Only general-use herbicides were kept and used for routine vegetation control along fence lines, guard rails, and flower beds. A contracted professional landscape management company provides for pest and plant/weed control at the Albany site.

## SUGAR LAND

### 10.1 Site Description



**Photo 10.1.1: City of Sugar Land**

The Sugar Land office, which has no laboratory facilities, does not engage in the same compliance assessment processes as the Morgantown, Pittsburgh, or Albany sites. Because building and facility operations and maintenance are under the control of the landlord, the Sugar Land office itself must comply with few ES&H regulations. The Sugar Land office does not undertake in-house audits, external audits, or subject matter reviews. Regulatory agencies do not conduct ES&H inspections or investigations of activities. However, in-house inspections and regulatory agency inspections (e.g., by the local fire

marshal or municipal building inspectors) of the building and facilities could occur, with any subsequent findings assessed against the landlord. Five employees work at the Sugar Land location; two are federal employees and three are site support contractors.

Building occupants participate in fire drills, which are conducted according to local fire marshal requirements and in cooperation with the building management. Volunteer fire wardens conduct roll call during drills and facilitate orderly evacuations. Tornado drills are announced through a building-wide public address system and are conducted in accordance with OSHA emergency response requirements.

The City of Sugar Land (Photo 10.1.1) does not impose recycling requirements that would apply directly to office space leases. Nevertheless, building management has a recycling program throughout the office building complex. The landlord has a building-wide recycling plan and procedure for tenant participation.

No citations for violations of ES&H laws, regulations, or ordinances occurred in 2014.

As of the most recent U.S. Census, there were 84,511 people and 24,935 households in the city. The population density was 2,434.2 per square mile. There were 27,727 housing units at an average density of 856.3 per square mile. The racial makeup of the city was 52.0 percent White, 10.6 percent Hispanic or Latino of any race, 35.3 percent Asian, 7.4 percent African American, and 2.3 percent from two or more races.

The median income for a household in the city was \$111,261. The per capita income for the city was \$39,991. About 5.8 percent of the population was below the poverty line. The major employers in Sugar Land are Fluor, Schlumberger, Methodist Sugar Land Hospital, Nalco, St. Luke's Hospital, Memorial Hermann, Noble, Camelot Desserts, Aetna, and Baker Petrolite.

## **10.2 Major Site Activities**

The facility of the NETL office in Sugar Land is located in The Granite Towers, an office building complex. NETL leases the offices under its own leasing authority. In 2014, the Sugar Land office undertook no actions to alter facilities or operation in a manner that could change the current impacts on the environment around the office.

## **COMPLIANCE STATUS**

The Sugar Land office had no off-site remediation activities, no on-site Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA) cleanups, and no spills or leaks from facilities or operations that were ongoing in 2014. No National Priorities List sites which NETL-Sugar Land had liability under CERCLA/SARA exist. No cleanups or surveillance activities for leaks or spills or other activities that would lead to Resource Conservation and Recovery Act (RCRA) cleanups occurred in prior years.

Sugar Land office does not have a program to deal with hazardous waste; however, building management does recycle some RCRA universal (hazardous) waste materials through an E-cycling program. This program is designed for pickup and disposal of electronics, dry-cell batteries, etc. through a local vendor on a biannual basis.

## **11.1 NEPA**

Sugar Land office does not conduct National Environmental Policy Act (NEPA) reviews for proposed off-site federal actions. These actions relate to contract awards or grants to other governmental organizations, educational institutions, and private industry, and were completed by NEPA staff in Morgantown, West Virginia. Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals under consideration for funding or financial support. The completed forms are evaluated by the NEPA compliance officer at the Morgantown site for a determination of the appropriate level of NEPA review (i.e., Environmental Impact Statement, Environmental Assessment, or categorical exclusion). In 2014, all funded projects were determined to be categorical exclusions.

## **11.2 TSCA and FIFRA**

Sugar Land housed no substances regulated by the Toxic Substances Control Act, and no restricted-use pesticides, herbicides, or defoliants were kept within the offices in 2014 or any other years. The landlord and building management organization provide pest control services and grounds-keeping services.

### **11.3 Radiation Protection**

#### **Ionizing Radiation Program**

No ionizing radiation sources are at Sugar Land.

#### **Laser Program**

The Sugar Land office has Class 1 lasers in common office devices, such as laser printers, CD readers within PCs, and fiber-optic communication lines. These lasers are built into devices that protect the consumer through engineering design. Staff members may also have laser pointers that are either Class 2 or Class 3 and are commonly used by speakers during lectures and presentations. A laser safety program has not been implemented at the Sugar Land site and is currently viewed as unnecessary due to the absence of more dangerous, higher class lasers.

### **11.4 Air Quality and Protection Activities**

Because it is strictly a project management office implementing oil and gas programs, Sugar Land has no air quality protection program and no emissions that require monitoring, reporting, or permits. In 2014, no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Sugar Land office occurred. Operation of the Sugar Land office does not contribute significantly to any violations of National Ambient Air Quality Standards. No Sugar Land office facilities or projects are regulated under the National Emission Standards for Hazardous Air Pollutants program. Sugar Land office facilities and projects do not have the potential to emit more than 10 tons per year of a single designated toxic air pollutant or more than 25 tons per year in aggregate of all toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants.

Any ozone-depleting refrigerants used for air conditioning inside the offices are under the control of the building management organization. No plans or activities are planned related to phasing out ozone-depleting substances at Sugar Land.

### **11.5 Water Quality and Protection Activities**

The building landlord and the landlord's building management contractor deal with sewer use permits and storm water runoff control and permits. The level of impact on surface water is assumed to be about the same as for other office complexes in the region. Sugar Land office activities in 2014 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.

In 2014, potable water supplies on site were tested to verify compliance with Safe Drinking Water Act standards. Testing was performed by the City of Sugar Land (municipal water authority) in compliance with the Safe Drinking Water Act standards, and the report can be reviewed at <http://www.Sugarlandtx.gov/utilities/index>. Sugar Land's water supply comes from the municipal water distribution network (City of Sugar Land).

## 11.6 Executive Orders

### **E.O. 13423—*Strengthening Federal Environmental, Energy, and Transportation Management***

This executive order requires federal agencies to implement an environmental management system. However, the Sugar Land office engages in minimal ES&H activities. The office consists of part of one floor of leased space inside an office building complex. On-site ES&H activity primarily focuses on Order 231.1 reporting (e.g., worker injury and lost workday data), the National Environmental Policy Act process, and affirmative procurement of office supplies and miscellaneous items. The Sugar Land office does not maintain an ES&H Management System, and is not covered by NETL's system in effect at the Albany, Morgantown, and Pittsburgh sites. The Sugar Land office does not have a formal pollution prevention program; however, staff members are involved through activities described under the Pollution Prevention Program above.

Sugar Land's electricity costs are included in the rent. Lights and air conditioning are governed by a building energy management system that uses timers, which are on between 6:00 a.m. and 6:00 p.m. and off at night, on weekends, and on holidays. Windows in the building are tinted and sealed, further reducing the need for cooling. Energy-efficient lighting has replaced conventional bulbs, and the staff purchases Energy Star® products when the opportunity arises. The Sugar Land tenant improvements included energy-saving light sensors within the office space. Granite Tower II has received a certification as an Energy Star® building and has applied for Leadership in Energy and Environmental Design (LEED) Silver certification. Although no formal energy efficiency training is in place for the Sugar Land office staff, they receive informal education through posters exhibited throughout the office. Also, the offices have containers for recyclables.

Sugar Land does participate in NETL's recycling program. As an example, surplus electronic personal property is disposed through qualified recycling vendors both in-place at the Sugar Land office, as well as returned to the Morgantown, West Virginia, site for sanitization prior to disposal. The Sugar Land office uses the NETL Small Purchase System to obtain supplies, which encourages affirmative procurement, i.e., purchase of items with recycled content.

## 11.7 Groundwater and Soil Quality Protection Activities

No additional groundwater or soil quality protection activities are required at Sugar Land.

## 11.8 Other Major Environmental Issues and Actions

The Sugar Land site is not aware of any ongoing or pending lawsuits, Notices of Violation, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. No violations of any compliance agreements or cleanup agreements or any unresolved compliance issues occurred. No audits were conducted in 2014 under the sponsorship of DOE Headquarters.

## ANCHORAGE

### 12.1 Site Description

NETL's Arctic Energy Office promotes the research, development, and deployment of energy production and conversion technology in Alaska. Activities in the Anchorage office include facilitating communication among Arctic energy stakeholders, as well as assessing Arctic energy research and development (R&D) needs associated with unconventional oil and gas, remote electric power technology, and tundra access. A reduction in Arctic Energy Office lease space requirements led to the relinquishing of the Fairbanks lease space at the end of FY2012. The Anchorage office remains the sole NETL Arctic Energy Office lease space in Alaska. In 2014, a site support contractor employee was the sole person staffing the Anchorage office.



**Photo 12.1: City of Anchorage**

Anchorage is Alaska's primary government, transportation, industry, and population center. Anchorage (Photo 12.1) is located in south-central Alaska on the northern end of the Cook Inlet, and is situated between the Chugach Mountains and the tidal inlets known as Turnagain and Knick Arms. By air, Anchorage is 55 minutes from Fairbanks and 3.5 hours from Seattle. It is located 358 road miles (576 km) south of Fairbanks.

As of the most recent U.S. Census, there were 291,826 people and 105,517 households in the city of Anchorage. The population density was 171.2 per square mile, with 113,032 housing units at an average density of 66.3 per square mile. The racial makeup was 66.0 percent White, 8.1 percent Asian, 7.9 percent Native American, 7.6 percent Hispanic or Latino, 5.6 percent African American, 2.0 percent Pacific Islander, and 8.1 percent from two or more races.

The median household income in Anchorage was \$76,495 and the per capita income was \$36,145. About 7.7 percent of the population was below the poverty line. The major employers in Anchorage are the military, state government, federal government (civilian sector), the University of Alaska, the Anchorage School District, Ted Stevens International Airport, and Providence Health and Services.

The Anchorage office consists of commercial lease space rented by the U.S. General Services Administration (GSA) on behalf of NETL. The lease includes 725 square feet of usable space, as well as one covered and one surface parking space. The Anchorage office is located in the same building and on the same floor as the U.S. Arctic Research Commission and the U.S. Small Business Administration. The five-story building additionally provides office space to several private companies, as well as storefront space to one retail business and one restaurant. The building is located in downtown Anchorage and is surrounded by numerous other commercial office buildings, parking facilities, retail businesses, hotels, and restaurants.

Building operations, maintenance, and janitorial services are under the control of the landlord, and therefore, minimal compliance assessments and ES&H inspections and investigations are required. The Anchorage office does not undertake in-house audits, external audits, or subject matter reviews. However, in-house inspections and regulatory agency inspections (e.g., by the local fire marshal or municipal building inspectors) of the building and facilities may occur, with any subsequent findings assessed against the landlord. Although fire drills are not practiced, the building is equipped with a fire detection and suppression system that is tested by the landlord on an annual basis.

GSA implements random inspections of the Anchorage lease space on a multi-year basis to ensure the building is compliant with all government requirements and local codes. Based on our current knowledge, no inspections occurred during 2014.

## **12.2 Environmental Compliance**

The Anchorage office provided office space to a single site support contractor employee. Due to the nature of the work (assessment of Arctic energy R&D need areas, coordination with Arctic energy stakeholders), the waste management services are minimal and are provided by the landlord under the terms of the rental agreement. The city of Anchorage does not impose recycling requirements that apply to leased office space. No formal recycling program is in place at the Anchorage office; however, designated containers exist for recycling paper and plastic.

The Anchorage office is not required to implement an environmental compliance program. It does not formally implement a pollution prevention program. Anchorage staff practice affirmative procurement whenever possible (i.e., the procurement of goods containing recycled content or having less life-cycle impact on the environment). No actions were taken in 2014 to alter the facility or operations in a manner that could change the current impacts on the environment in or around the Anchorage office.

The Anchorage office had no off-site remediation activities, no on-site Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA) cleanups, and no spills or leaks from facilities or operations ongoing in 2014. NETL-Anchorage had no liability for National Priorities List sites under CERCLA/SARA. No cleanups or surveillance activities for leaks or spills or other activities occurred that would lead to Resource Conservation and Recovery Act cleanups.

## **12.3 NEPA**

NETL independently reviews any contract performed through or supported by the Arctic Energy Office for potential environmental impact before the project is undertaken. The Anchorage office does not conduct National Environmental Policy Act (NEPA) reviews for such proposed, offsite actions. These actions typically involve contract awards to other governmental organizations, educational institutions, and private industry. Project proponents fill out a questionnaire addressing the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. NETL's NEPA compliance office then

reviews the completed questionnaire to determine the appropriate level of NEPA review (i.e., Environmental Impact Statement, Environmental Assessment, or categorical exclusion). In 2014, no new projects were supported by the Arctic Energy Office and thus no projects managed through the Anchorage office were subject to NEPA review.

#### **12.4 Radiation Protection**

The only sources of potentially harmful radiation in the Anchorage office are Class 1 lasers commonly found in printers and CD/DVD readers/recorders. Anchorage staff is ensured protection from these lasers through proper engineering design of the electronic devices.

#### **12.5 Air Quality and Protection Activities**

The air quality in the city of Anchorage is in compliance with all governing regulations. The Anchorage office landlord is responsible for maintaining sufficient air quality in the building, and implements ventilation air filter changes on a quarterly basis. Any ozone-depleting refrigerants that may be used for air conditioning are under the control of the landlord.

Due to the nature of the work performed (assessment of Arctic energy R&D need areas, coordination with Arctic energy stakeholders), the Anchorage office is not a major source of air emissions and therefore it is unnecessary to implement air quality monitoring, regulation, or protection programs.

#### **12.6 Water Quality and Protection Activities**

The Anchorage office landlord is responsible for maintaining sewer and storm water and other related permits. The landlord tests the domestic water supply annually to ensure compliance with Safe Drinking Water Act standards.

#### **12.7 E.O. 13423: *Strengthening Federal Environmental, Energy, and Transportation Management***

NETL-Anchorage engages in minimal ES&H activities. On-site ES&H primarily focuses on affirmative procurement of office supplies and miscellaneous items. The Anchorage office does not maintain an ES&H Management System and is not covered by NETL's ES&HMS system in effect at the Albany, Morgantown, and Pittsburgh sites. No citations for violations of ES&H laws, regulations, or ordinances occurred in 2014.

The Anchorage office landlord additionally practices affirmative procurement and has been phasing out low-cost, low-efficiency T12 lamps with higher efficiency replacements, per DOE's 2009 energy efficiency standards for general-service fluorescent lamps.

#### **12.8 Other Major Environmental Issues and Actions**

Anchorage staff is not aware of any ongoing or pending lawsuits, Notices of Violation, public accusations of regulatory violations, or any environmental occurrences. No violations of

compliance agreements or cleanup agreements or any unresolved compliance issues have occurred. No audits were conducted in 2014 under the sponsorship of DOE Headquarters, independent regulators, or other independent third parties.

## APPENDIX

### 13.1 Acronym List

AAD	Acquisition and Assistance Division
ACHD	Allegheny County Health Department
AEA	Atomic Energy Act of 1954
AEP	American Electric Power Service Corporation
AES	American Environmental Services, Inc.
AHA	Activity Hazard Analysis
AIIS	Assessment Information Input System
ALARA	As Low As Reasonably Achievable
ALB	Albany, Oregon
ANWR	Alaska National Wildlife Refuge
AQCR	Air Quality Control Region
ARRA	American Recovery and Reinvestment Act
B-	Building
BAMF	Biomass Alternative Methane Fuel
BOD	Biochemical Oxygen Demand
CO <sub>2</sub> e	Carbon Dioxide equivalent
CAA	Clean Air Act
CBOD5	Carbonaceous Biochemical Oxygen Demand 5-day Test
CBT	Computer-Based Training
CCPI	Clean Coal Power Initiative
CCUS	Carbon Capture, Utilization, and Storage
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFC	Chlorofluorocarbon
CFO	Chief Financial Officer
CFR	U.S. Code of Federal Regulations
COD	Chemical Oxygen Demand
COPC	Contaminants of Potential Concern
CRADA	Cooperative Research and Development Agreement
CWA	Clean Water Act
CX	Categorical Exclusion
CY	Calendar Year
DMR	Discharge Monitoring Report
DOE	U.S. Department of Energy
DOEGRIT	DOE Green IT
DOT	Department of Transportation
EA	Environmental Assessment
ECM	Energy conservation measure
EISA	Energy Independence and Security Act
EIS	Environmental Impact Statement
EMP	ES&H Management Plan

EMS	Environmental Management System
E.O.	Executive Order
EOR	Enhanced Oil Recovery
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
EPP	Environmentally Preferred Product
ERO	Emergency Response Organization
ES&H	Environmental, Safety, and Health
ES&HMS	Environmental, Safety, and Health Management System
ESPC	Energy Savings Performance Contract
ESS&H	Environmental, Safety, Security, and Health
FCOG	Facility Contractors Group
FE	Office of Fossil Energy
FEMP	Federal Emergency Management Program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLC	Federal Laboratory Consortium
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GCFCI	Ground-Fault Circuit Interrupter
GHG	Greenhouse Gas
GIS	Geographic Information System
GMP	Groundwater Management Program
GPP	General Plant Project
GSA	U.S. General Services Administration
HAZWOPER	Hazardous waste operations and emergency training
HPSB	High Performance and Sustainable Buildings
HVAC	Heating, Ventilation, and Air Conditioning
HQ	Headquarters
IAQ	Indoor Air Quality
ICCS	Industrial Carbon Capture and Sequestration
IGCC	Integrated Gasification Combined Cycle
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LDR	Land Disposal Restriction
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
LLRW	Low-Level Radioactive Waste
MAA	Mutual Aid Agreement
MGN	Morgantown, West Virginia
MRT	Management Review Team
MSHA	Mine Safety and Health Administration
MUB	Morgantown Utility Board
NAAQS	National Ambient Air Quality Standards
NEC	National Electric Code
NEPA	National Environmental Policy Act

NESHAP	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NETL-RUA	NETL-Regional University Alliance
NFPA	National Fire Protection Association
NIMS	National Incident Command System
NIOSH	National Institute of Occupational Safety and Health
NNSA	National Nuclear Security Administration
NORM	Naturally occurring radioactive material
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPRA	National Petroleum Reserve
NRC	Nuclear Regulatory Commission
ODEQ	Oregon Department of Environmental Quality
ODS	Ozone-Depleting Substance
OHSAS	Occupational Health and Safety Assessment Series
OIO	Office of Institutional Operations
ORD	Office of Research and Development
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PADEP	Pennsylvania Department of Environmental Protection
PCB	Polychlorinated Biphenyl
PGH	Pittsburgh, Pennsylvania
PHA	Pleasant Hills Authority
QA	Quality Assurance
QC	Quality Control
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Credit
SARA	Superfund Amendments and Reauthorization Act
SARS	Safety Analysis and Review System
SBEUC	Simulation-Based Engineering User Center
SCC	Strategic Center for Coal
SCNGO	Strategic Center for Natural Gas and Oil
SHPO	State Historic Preservation Officer
SMS	Safety Management System
SOFC	Solid Oxide Fuel Cell
SOD	Site Operations Division
SPCC	Spill Prevention, Control, and Countermeasures Plan
SSP	Site Sustainability Plan
SVOC	Semi-Volatile Organic Compound
SWQM	Surface Water Quality Manager
TCE	Trichloroethylene
TLD	Thermo-Luminescent Dosimeter
TMDL	Total Maximum Daily Loading
TOX	Total Organic Halogens

TPH	Total Petroleum Hydrocarbons
TPQ	Threshold Planning Quantity
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
TSS	Total Suspended Solids
USDA	U.S. Department of Agriculture
USGBC	U.S. Green Building Council
VOC	Volatile Organic Compound
WDEQ	Wyoming Department of Environmental Quality
WVDEP	West Virginia Department of Environmental Protection
WVU	West Virginia University
WWTF	Wastewater Treatment Facility

## 13.2 Tables and Figures

Table 1.2.1: ES&H Programs
<p>Affirmative Procurement Advocate/Greening Acquisition Program</p> <p>Air Quality Program</p> <p>Alarms Oversight Program</p> <p>Asbestos and Lead Abatement Program</p> <p>Authority Having Jurisdiction (AHJ)/Exemptions Program</p> <p>Assessment Information Input System (AIIS) Program</p> <p>Computerized Accident/Incident Report System (CAIRS) Program (Injury/Illness Reporting)</p> <p>Chemical Handling Facility</p> <p>Chemical Hygiene Program</p> <p>Chemical Inventory and Safety Data Sheet (SDS) Program</p> <p>Confined Space Program</p> <p>Construction and Maintenance Safety Program</p> <p>Cryogenic Safety Program</p> <p>Directives Program</p> <p>Electrical Safety Program</p> <p>Emergency Preparedness Program/Emergency Response Program</p> <p>Environment, Safety, and Health Management System (ESHMS)— Management Review Program</p> <p>Environmental Program</p> <p>Ergonomics Program</p> <p>ES&amp;H Communications Program</p> <p>ES&amp;H Training Program</p> <p>Facility and Area Custodian Program</p> <p>Facility Work Authorization Program (Site Operations Division)</p> <p>Facility Safety Committee Program</p> <p>Fire Protection Program</p> <p>Fire Warden Program</p> <p>Ground Water Quality Program</p> <p>Hazard Communication Program</p> <p>Hazardous Waste Program</p> <p>Hearing Conservation Program</p> <p>Illumination Quality Program</p> <p>Inactive Waste Sites/Off-Site Remediation Program</p> <p>Indoor Air Quality and Ventilation Program</p> <p>Industrial Hygiene Program</p> <p>Industrial Wastewater Quality Program</p> <p>Laser Safety Program</p> <p>Lessons Learned Program</p> <p>Life Safety Program</p>

Table 1.2.1: ES&amp;H Programs

Medical Monitoring Program
National Environmental Policy Act (NEPA) Compliance Program
Resource Conservation and Recovery Act (RCRA) Nonhazardous Waste Program
Occupational Medicine Program
Occurrence Reporting and Processing System (ORPS) Program
Organization Incident Reporting Program
OSHA Safety Program
R&D Projects Program
Radiation Safety Program
Records Program
Respiratory Protection Program
Safety & Health Program
Superfund Amendments and Reauthorization Act (SARA) Title III Program
Safety Analysis and Review System (SARS) Program
Soil Quality Program
Storage Tank Program
Surface Water Quality Program
Waste Management Oversight Program
Waste Minimization and Pollution Prevention Program
Water Quality Program
Workers' Compensation Program
Worker Protection Program

Table 2.3.1: Environmental, Safety, and Health Significant Aspects for FY2014

Waste Minimization, Pollution Prevention, and Recycling
High Performance Sustainable Building Implementation
Hazardous Materials Procurement, Consumption, and Storage
Electronic Stewardship
Energy and Fuel Use
Greenhouse Gas Air Emissions
Green Purchasing
Pest and Other Landscaping Management
Accidents/Incident Rates
Water Usage
Groundwater Legacy Issues
Infrastructure Safety
On-site Construction Activities

Table 2.4.2: FY2014 Environmental Management Plan Metrics				
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
<b>Waste Minimization, Pollution Prevention, and Recycling</b>				
<b>Nonhazardous Waste Generation</b>	Reduce the amount of routine nonhazardous waste generated based on an FY2008 baseline of 222.5 metric tons. (E.O. 13423)  Maintain cost-effective waste prevention and recycling programs (E.O. 13423), and minimize generation of waste and pollutants through source reduction. (E.O. 13514)	222.5 metric tons	<b>195.8 metric tons (12% Reduction)</b>	<b>190.81 metric tons (14% Reduction)</b>
<b>Hazardous Waste Generation</b>	Reduce the amount of hazardous waste based on an FY2008 baseline of 3.0 metric tons. (E.O. 13423)	3.0 metric tons	<b>2.60 metric tons (13.3% Reduction)</b>	<b>0.78 metric tons (74% Reduction)</b>
<b>Recycling</b>	Using an FY2010 baseline (632,723 lbs.), increase recycling by 30% by the end of FY2013 and divert 50% of nonhazardous solid waste from disposal by the end of FY2015. (E.O. 13514)	632,723 lbs. (287 metric tons)	<b>189,817 lbs. (86.1 metric tons) 30% Increase</b>	<b>538,689 lbs. (244.3 metric tons) 85% Increase</b>
<b>Recycling Construction Waste</b>	Recycle a minimum of 50% of construction/demolition waste diverted from landfill disposal by the end of FY2015. (E.O.13514) Increase recycling construction waste to 44%.		<b>44%</b>	<b>95.1%</b>
<b>High-Performance Sustainable Building Implementation</b>				
<b>High Performance Sustainable Buildings</b>	Ensure all new construction, major renovation, or repair and alteration complies with the Guiding Principles. (E.O. 13514)  Ensure 15% of existing facilities and building leases (above 5,000		<b>Track the completion status of upgrades/renovations to High-Performance Sustainable Buildings (HPSB) identified in the Site Sustainability Plan.</b>	<b>MGN B-40 (Day Care) received USGBC LEED Gold certification. MGN B-39 gained HPSB status.</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
	gross square feet) meet the Guiding Principles by FY2015. (E.O. 13514)  Make annual progress towards 100% conformance with the Guiding Principles. (E.O. 13514)			
	Ensure all new construction, major renovation, or repair and alteration greater than \$5 million will be LEED Gold certified. Projects less than \$5 million will meet HPSB Guiding Principles. (E.O. 13514)		<b>Submit Site Sustainability Plan (SSP) to DOE-HQ.</b>	<b>Site Sustainability Plan submitted to DOE-HQ.</b>
<b>Historic Buildings</b>	Promote long-term viability of agency-owned historic buildings by ensuring that mission-driven renovation, rehabilitation, and upgrades use best practices and technologies in retrofitting within the constraints of the Historic Preservation Act. (E.O. 13514)  Develop a Historic Preservation Plan for the Albany site that allows for conformance to the Historic Preservation Act while having facilities that effectively support program and mission needs.		<b>Ensure that the design for the Building 31 Laboratory Renovations take historic preservation requirements into account.</b>	<b>This item is completed. Historic preservation requirements have been taken into account in the design.</b>
			<b>Renegotiate Programmatic Agreement with Oregon SHPO.</b>	<b>It is expected that a task order to DRS Architects to develop a Site Historic Property Management Plan will be in place by the 2nd Quarter of FY15. A plan can then be developed by the end of FY15. This will allow for the development of a renegotiated Programmatic Agreement in FY16.</b>
			<b>Finalize Historic Preservation Plan based on the R&amp;D Site Consolidation Plan and the renegotiated Programmatic Agreement.</b>	<b>It is expected that a task order to DRS Architects to develop a Site Historic Property Management Plan will be in place by the 2nd Quarter of FY15. A plan can then be developed by the end of FY15.</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics				
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Hazardous Materials Procurement, Consumption, and Storage				
Chemical Inventory	Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015 by quantifying the number of containers on-site at NETL at the end of FY2012 as a baseline. (E.O. 13514)	13,035 containers  277,419 lbs.	No net gain (less than 10% of baseline) of chemicals (by number of containers and/or weight in pounds).	13,327 containers  250,799 pounds
			Perform an assessment of liquid nitrogen, carbon dioxide, and hydrochloric acid to determine if there are opportunities for decreasing the chemical inventory by decreasing the use of these three chemicals.	The assessment was started, but was not completed.
			Ensure that 80% of NETL employees have completed Global Harmonization System (GHS) training by November 22, 2013 and 100% by March 1, 2014.	93% of NETL employees have completed this training.
Electronic Stewardship				
Purchase of Electronic Products	Ensure procurement reference for EPEAT-registered electronic products and the procurement of Energy Star- and FEMP-designated electronic equipment. (E.O. 13514)		95% of all products purchased that have EPEAT standards are EPEAT registered.	99% of products are EPEAT-registered.
			95% of specific electronic products are Energy Star- and FEMP-designated.	100% of products are Energy Star- and FEMP-designated.
Operation and Maintenance of Electronic Products	Enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. (E.O. 13514)  Ensure that 90% of managed workstations and printers have power management settings in place. (IG findings)		Ensure that 90% of managed workstations and printers have power management settings in place.	100% of printers and 97.3% of PCs have power management settings in place.
Energy and Fuel Use				
Energy Use	Reduce energy usage/square foot by 3%	223,700 Btu/gsf	163,291 Btu/ft <sup>2</sup> (27% Reduction)	167,625 Btu/ft <sup>2</sup> (25.1% Reduction)

Table 2.4.2: FY2014 Environmental Management Plan Metrics

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
	<p>annually through the end of FY2015 based on the FY2003 baseline—223,700 Btu/sq. ft. (E.O. 13423)</p> <p>Reduce energy intensity in buildings to achieve GHG reductions. (E.O. 13514)</p>			
<b>Advanced Metering and Measurement</b>	<p>Install advanced electrical metering in NETL's energy-consuming buildings greater than 1,000 gsf of energy by October 1, 2012. (EPAAct 2005)</p> <p>Install advanced metering for natural gas and potable water in NETL's energy-consuming buildings greater than 1,000 gsf of energy by October 1, 2015. (EPAAct 2005)</p>		<p><b>Install utility meters in NETL MGN buildings as follows:</b></p> <p><b>B2 = Water</b></p> <p><b>B4 = Gas, Steam, Water</b></p> <p><b>B5 = Gas, Steam, Water</b></p> <p><b>B13 = Gas, Steam, Water</b></p> <p><b>B17 = Water</b></p> <p><b>B29 = Gas, Water</b></p> <p><b>B33 = Water</b></p>	<b>All utility meters for MGN have been installed in FY14.</b>
			<b>Award a construction project to install advanced meters for water and natural gas for Albany buildings that are identified in the NETL consolidation plan.</b>	<b>Funding was not approved for this project and no construction project will be awarded during FY14.</b>
<b>Management of Servers and Data Centers</b>	Update DC profile studies to DOE Green IT database for two NETL data centers (B-922 and B-39) to satisfy E.O. 13514.		<b>Have dedicated smart meters installed at the data center in B-39.</b>	<b>The B-39 meter was not installed in FY 2014.</b>
			<b>Evaluate B-39 and B-922 data centers using DOEGRIT.</b>	<b>Evaluation of B-39 using DOEGRIT was completed in FY 2014.</b>
			<b>Review, design, and implement energy efficiency upgrades to B-39 and B-922 data centers.</b>	<b>Contract was placed in 4th qtr. of FY 14 to improve energy efficiency of B-39 data centers. If proven successful, similar upgrade to B-922 data center will be pursued.</b>
<b>Renewable Energy</b>	Increase renewable energy consumption to 7.5% in FY2013. (E.O. 13423)	5%	<p>7.5%</p> <p>2,350 MWh</p>	<b>11.5 MWh + RECs to meet 2,350 MWh</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
	Total renewable electrical energy consumption is estimated to be 2,775 MWh. Total energy consumption is estimated to be 37,000 MWh.	% of renewable energy consumption		
	Ensure that 50% of statutorily required renewable energy comes from “new” (developed after 1999) sources. (E.O. 13423)—2.5% of 37,000 MWh)	1,574 MWh	<b>1,175 MWh</b> <b>50%</b> <b>(2.5% of all energy sources)</b>	<b>0.04% Onsite + RECs to meet 50% and 2.5% of all sources.</b>
	Procure Renewable Energy Credits to meet 7.5% renewable energy goal.		<b>7.5% of all electricity on site should be from renewable electricity generation. (2,350 MWh)</b>	<b>0.04% Onsite + RECs to meet 7.5%</b>
<b>Petroleum Fuels</b>	Reduce the vehicle fleet's total consumption of petroleum products by 2% annually through the end of FY2020 using a FY2005 baseline. (E.O. 13423)	21,602 gallons	<b>18,146 gallons</b> <b>(16%)</b>	<b>9,942 gallons</b> <b>(54%)</b>
<b>Alternative Fuels</b>	Increase the total fuel consumption that is non-petroleum-based by 10% annually through the end of FY2015 based on FY2005 baseline. (E.O. 13423)	10,483 gallons	<b>22,434 gallons</b> <b>11%</b>	<b>15,992 gallons</b> <b>56%</b>
<b>Greenhouse Gas Air Emissions</b>				
<b>Greenhouse Gases</b>	Reduce Scope 1 and 2 GHG emissions attributed to facility use through life-cycle cost-effective measures by 28% by FY2020, relative to a FY2008 baseline. (59,751,816 lbs. CO <sub>2</sub> e.) (E.O. 13514)	59,751,816 lbs. CO <sub>2</sub> e	<b>49,594,007 lbs. CO<sub>2</sub>e</b> <b>17%</b>	<b>39,493,204 lbs. CO<sub>2</sub>e</b> <b>33.9%</b>
	Reduce Scope 3 GHG emissions by 13% by FY2020, relative to a FY2008 baseline. (E.O. 13514)	14,302,252 lbs. CO <sub>2</sub> e	<b>13,672,953 lbs. CO<sub>2</sub>e</b> <b>4.4%</b>	<b>8,291,500 lbs. CO<sub>2</sub>e</b> <b>42%</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
<b>GHG Emission Reporting</b>	Report comprehensive GHG emission inventory for FY2010 by January 5, 2011, and annually thereafter by the end of January. (E.O. 13514)		<b>Report emission inventories on a quarterly basis for year-end (FY) wrap up by January 31, 2014.</b>	<b>Total emissions = 47,784,704 lbs. CO<sub>2</sub>e</b>
<b>Scope 3 Emissions</b>	Annually monitor and track Scope 3 GHG emissions associated with employee commuting and required travel and training. (E.O. 13514)		<b>Emphasize employee ridesharing through NETL's green transportation pool, Plugged-In articles, and Post-Its.</b>	<b>NETL is reducing travel for training and conferences to reduce greenhouse gas emissions.</b>
<b>Green Purchasing</b>				
<b>Environmentally Preferred Products (Sustainable Acquisition)</b>	Maximize site use of EPPs in operation and maintenance, janitorial, and general office activities. (E.O. 13514)		<b>Ensure that 95% of new contract actions for products and services are: energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives.</b>	<b>95% of contract actions will be energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives.</b>
	Purchase products that are recycled, bio preferred, Energy Star, FEMP-designated, EPEAT, Water Sense-, or otherwise water efficient. (E.O. 13423)		<b>70% of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's Green Purchasing Standards.</b>	<b>93.85% of janitorial products will be EPPs.</b>
	Acquire uncoated printing and writing paper containing at least 30% post-consumer fiber. Reduce printing paper use. (E.O. 13514)		<b>98% of copier and printer paper shall contain a minimum of 30% recycled post-consumer fiber by September 30, 2014.</b>	<b>97.25% of copier and printer paper will contain 30% recycled post-consumer fiber.</b>
<b>Pest and Other Landscaping Management</b>				
<b>Pest Management</b>	Reduce the deer population at the PGH and MGN sites at a sustainable level per the wildlife management plan. (NETL—Deer Population Problem)		<b>Implement the Wildlife Management Plan.</b>	<b>Based on Nov 2014 survey results, will prepare for a culling sometime in the spring (or at the USDA's recommendation) of FY15 at both MGN and PGH sites.</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics				
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
	Implement pest management and other landscaping management practices. (E.O. 13514)			
<b>Accidents/Incident Rates</b>				
<b>Recordable Case Rate</b>	Continue to maintain NETL's OSHA recordable case rate to or below 1.0. (FE ESS&H Commitment to ESS&H)		<b>1.0</b>	<b>0.79</b>
	Issue quarterly Post-It addressing workplace safety issues.		<b>Complete Quarterly Post-It addressing workplace safety issues.</b>	<b>12 total Post-Its were sent to the Intranet for posting in the fiscal year.</b>
<b>Days Away/ Restricted (DART) Case Rate</b>	Continue to maintain NETL's OSHA days away/restricted (DART) case rate to or below 0.4 in FY2012. (FE ESS&H Commitment to ESS&H)		<b>0.4</b>	<b>0.43</b>
	Review types of accidents that occurred in FY2013; conduct semi-annual audits of work areas.		<b>Review accidents and conduct audits.</b>	<b>Thirty-six site safety focus inspections and 196 audits of work areas were conducted. A total of 13 OSHA recordable injury cases were also reviewed.</b>
<b>Water Usage</b>				
<b>Potable Water Consumption</b>	Reduce water consumption intensity, relative to the baseline of 27.3E6 gallons, which equates to 26.3 gal/gsf through life-cycle cost-effective measures by 2 percent annually through FY2020 or 26% by the end of FY2020 using a baseline of FY2007 water consumption. (E.O. 13514)	26.3 gal/gsf	<b>23.14 gal/gsf (12% Reduction)</b>	<b>16.66 gal/gsf (36.7% Reduction)</b>
<b>Groundwater Legacy Issues</b>				
<b>Remediate Groundwater</b>	Prevent and mediate health, environmental, and regulatory impacts of groundwater contamination at the Albany site.		<b>Complete RI/FS scoping plan outline by 12/31/2013, analyze and describe all sections in scoping plan that are incomplete by</b>	<b>Complete working version of Remedial Investigation/Feasibility Study (RI/FS) scoping plan which was updated and submitted on</b>

Table 2.4.2: FY2014 Environmental Management Plan Metrics

Table 2.4.2: FY2014 Environmental Management Plan Metrics				
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
			6/30/2014, and begin to implement actions to fill in missing information in the RI/FS scoping plan.	6/24/2014, which will be used as a “living document” for planning purposes and execute initial actions to complete the RI/FS scoping plan.
			Update the conceptual site model and the groundwater monitoring plan annually, which includes development of contaminant trend maps.	Conceptual site model and groundwater monitoring plan were finalized were approved in January 2014.
			Complete two sampling events per year in the spring (high water) and fall (low water) seasons.	Wet season sampling event completed in February 2014, with final report delivered on 5/19/2014. Dry season sampling event completed in Aug. 2014, with final report delivered on 11/13/2014.
			Maintain current knowledge of contaminants in the groundwater.	Knowledge base is current through Aug. 2013 sampling event.
Infrastructure Safety				
Electrical Safety	Identify all electrical arc flash issues, develop plans to address these issues, and eliminate the issues by FY2015.		Implement the plans for three of the five projects between the Albany, Morgantown, and Pittsburgh sites that will address the electrical arc flash issues.	Started construction on two projects and procured a contractor for the third project.
Life Safety Code Issues	Programmatically and systematically bring the Albany site into life safety code compliance.		Implement the Facility SARS program at the Albany site by completing Facility SARS packages for 20% of the site facilities (8 per year) over the next five years, working based on a priority listing established by ESS&H and SOD.  The Albany Facility Fire Protection	SSC directed by SOD to prepare Facility SARS packages for nine (9) facilities during FY2014 (starting in Jan 2014). To date - several packages are in-process, but none have been finalized.  Albany FFPA is actively used to prioritize corrective actions, project design plans,

Table 2.4.2: FY2014 Environmental Management Plan Metrics




Table 2.4.2: FY2014 Environmental Management Plan Metrics				
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
			Appraisal (FFPA) will be used to document/prioritize future actions.	and work orders to correct life safety issues at the ALB site, with progress towards eliminating FFPA findings and opportunities for improvement.
On-Site Construction Activities				
On-Site Construction Activities	Continually evaluate and improve ES&H performance related to on-site construction activities in order to minimize work stoppages, OSHA violations, and reporting to external agencies.		Issue a quarterly tracking report of ES&H (daily, weekly, and monthly) inspections of on-site construction activities, including inspections.	Inspections = 4,400
			Issue a quarterly tracking report of SARS and AHAs associated with construction activities.	AHAs = 100 ES&H Plans = 40
			Minimize the number of reports to external agencies to be less than or equal to one per year.	As documented (Current YTD Reports = Zero—No Issues)
<div><div> Objective/target not met in FY2014</div><div> Objective partially met in FY2014</div><div> Objective/target met in FY2014</div></div>				

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
Waste Minimization, Pollution Prevention, and Recycling						
Nonhazardous Waste Generation		Reduce the amount of routine non-hazardous waste generated (3% per year) using a FY2008 baseline of 222.5 metric tons. (E.O. 13423)  Maintain cost-effective waste prevention and recycling programs, and minimize generation of waste and pollutants through source reduction. (E.O. 13514)		222.5 metric tons	182.45 metric tons  (18%)	60.6 metric tons
Hazardous Waste Generation		Reduce the amount of hazardous waste using a FY2011 baseline of 3 metric tons. (E.O. 13423 and E.O. 13514)		3.0 metric tons	2.2 metric tons  (26.6%)	0.09 metric tons  (88%)
Recycling		Using a FY2010 baseline (632,723 lbs.), increase recycling 40% by the end of FY2014. (E.O. 13514)  Increase diversion of solid waste with the goal of diverting 50% of NETL’s non-hazardous solid waste from disposal by the end of FY2015; this does not include diversion of waste to energy plants. (E.O.13514)		632,723 lbs.  (287 metric tons)	316,362 lbs.  (50%)	129,284 lbs.  (20%)
Recycling Construction Waste	Recycle at least 50% of construction/demolition waste diverted from landfill disposal by the end of FY2015. (E.O. 13514)  Increase recycling construction waste to 47%.			50%		26%
High-Performance Sustainable Building Implementation						

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
High-Performance Sustainable Buildings	Ensure all new construction, major renovation, or repair and alteration complies with the Guiding Principles. (E.O. 13514)			Track the completion status of upgrades/renovations to High-Performance Sustainable Buildings (HPSB) as identified in the Site Sustainability Plan.	FY 2012/2013/2014 GPP HPSB projects were awarded to bring existing buildings in the NETL HPSB Plan up to HPSB Guiding Principles and make progress towards 100% conformance with the Guiding Principles. Upgrades to MGN B-1, MGN B-26, ALB B-26, PGH B-58, PGH B-900, PGH B-920 and PGH B-921 will bring these buildings up to HPSB Guiding Principles.	
	Ensure 15% of existing facilities and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY2015. (E.O. 13514)					
	Make annual progress towards 100% conformance with the Guiding Principles. (E.O. 13514)					
	Ensure all new construction, major renovation, or repair and alteration greater than \$5 million will be LEED Gold certified. Projects less than \$5 million will meet HPSB Guiding Principles. (E.O. 13514)			Submit Site Sustainability Plan (SSP) to DOE-HQ.	Site Sustainability Plan submitted to DOE-HQ on December 04, 2014.	
Historic Buildings	Promote long-term viability of agency-owned historic buildings by ensuring that mission-driven renovation, rehabilitation, and upgrades utilize best practices and technologies in retrofitting within the			Complete a Building 2 Feasibility and Cost Estimate Study to define resources required for various dispositions of Building 2, including options for sealing the building envelope, demolition, and full renovation.	The Building 2 Feasibility and Cost Estimate Study has been funded and is expected to be awarded to DRS Architects in January 2015.	

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
	constraints of the Historic Preservation Act. (E.O. 13514) Develop a Historic Preservation Plan for the Albany site that allows for conformance to the Historic Preservation Act and reflects the Albany Implementation Plan while having facilities that effectively support program and mission needs.			Ensure that the design for the Building 35 Fire Protection & Ventilation Upgrades project take historic preservation requirements into account and that Oregon SHPO concurrence is obtained as necessary.	The Building 35 Fire Protection and Ventilation Upgrades project design task has been awarded to DRS Architects and is underway. The 15% design documents are expected to be delivered by February 2015.	
				Initiate a task order with the SOD A/E firm to develop an Albany Site Historic Preservation Plan, with Oregon SHPO concurrence that will meet the requirements of both the Albany Site Consolidation Implementation Plan and the Oregon SHPO.	The Albany Site Historic Preservation Plan was not funded in Q1, FY15. It was decided that this plan development would not be initiated until the B-2 Feasibility and Cost Estimate Study is completed and evaluated.	
Hazardous Materials Procurement, Consumption, and Storage						
Chemical Inventory	Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015 using the number of containers onsite at NETL at the end of FY2012 as a baseline. (E.O. 13514)	13,035 containers  277,419 pounds		No net gain (less than 10% of baseline) of chemicals (by number of containers and/or weight in pounds).	13,627 containers (4% increase)  262,871 pounds (5% decrease)	
	Begin implementing the GHS at NETL by ensuring that 100% of personnel complete the GHS HAZCOM			Perform an assessment of liquid nitrogen, carbon dioxide, and hydrochloric acid to determine if there are opportunities for decreasing the chemical inventory by decreasing the use of these three chemicals.	The assessment is in progress.	

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter				
Environmental Management Plan	Objective/Target		Baseline	Target
	training by January 31, 2015.		Ensure that 100% of NETL employees have completed Global Harmonization System (GHS) training by January 31, 2015.	93% of NETL employees completed GHS. Of 1,688 employees, 1,438 completed this training and 250 employees have not.
<b>Electronic Stewardship</b>				
<b>Purchase of Electronic Products</b>	Ensure procurement reference for EPEAT-registered electronic products and the procurement of Energy Star- and FEMP-designated electronic equipment. (E.O. 13514)  Revisit and ensure that accurate measures are in place for this activity and ensure that the results of our measures are meeting the requirements of the aspect.		95% of all products purchased that have EPEAT standards are EPEAT registered.	96% of products are EPEAT registered.
			95% of specific electronic products are Energy Star- and FEMP-designated.	96% of electronic products are Energy Star- and FEMP-designated.
<b>Operation and Maintenance of Electronic Products</b>	Enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. (E.O. 13514)  Ensure that 90% of managed workstations and printers have power management settings in place. (IG findings)		Ensure that 90% of managed workstations and printers have power management settings in place.	93.5% of workstations and 100% of printers have power management settings in place.
<b>Natural Resource Use</b>				

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
Energy Use	Reduce energy usage/square foot by 3% annually through the end of FY2015 based on the FY2003 baseline of 223,700 Btu/sq. ft. (E.O. 13423)  Reduce energy intensity in buildings to achieve GHG reductions. (E.O.13514)	223,700 Btu/gsf	156,580 Btu/ft² (30%)	50,329 Btu/ft² (10%)		
Advanced Metering and Measurement	Install advanced electrical metering in NETL’s energy-consuming buildings greater than 1,000 gsf by October 1, 2012. (EPAct 2005)  Install advanced metering for natural gas and potable water in NETL’s energy-consuming buildings greater than 1,000 gsf by October 1, 2015. (EPAct 2005)		Award a construction project to install advanced meters for water and natural gas for Albany buildings that are identified in the NETL consolidation plan.	A building list has been developed and the work statement is 95% complete.		
Management of Servers and Data Centers	Update DC profile studies to DOE Green IT database for two NETL data centers (B-922 and B-39) to satisfy E.O. 13514.		Have dedicated smart meters installed in B-39, ALB, and B-922 data centers in order to measure a monthly PUE.	The ALB and B-39 meter have not been installed.		
			Review, design, and implement energy efficiency upgrades to NETL data centers in B-39, ALB, and B-922.	SOD A/E Firm designed energy efficiency upgrades for B-39 data center. Contract was placed in 4th qtr. of FY 14.		
Petroleum Fuels	Reduce the vehicle fleet’s total consumption of petroleum products by 2% annually through the end of FY2020 based on a FY2005 baseline. (E.O. 13423)	21,602 gallons	17,282 gallons (20% Reduction)	2,818 gallons 47.8%		

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter					
Environmental Management Plan		Objective/Target	Baseline	Target	Actual
Alternative Fuels	Increase the total fuel consumption that is non-petroleum-based by 10% annually through the end of FY2015 based on a FY2005 baseline. (E.O. 13423)	10,483 gallons	27,151 gallons		5,206 gallons
			159%		
Renewable Energy	Continue renewable energy consumption at 7.5% in FY2014 (E.O. 13423). Total renewable electrical energy consumption is estimated to be 2,350 MWh; total energy consumption is estimated to be 31,300 MWh.	5%	7.5%  2,195 MWh (549 MWh/Qtr.)		0.13%  39.5 MWh
	Ensure that 50% of statutorily required renewables come from “new” (developed after 1999) sources. (E.O. 13423) (2.5% of 31,300 MWh)	1,574 MWh	1,175 MWh (294 MWh/Qtr.)  50% (2.5% of all energy sources)		11.5 MWh  0%
	Procure Renewable Energy Credits Certificates (RECs) to meet 7.5% renewable energy goal.		7.5% of all electricity on-site should be renewable electricity generation. (2,350 MWh)		0.13% of total electricity is from onsite renewable.  NETL plans to purchase RECs to meet this goal.
Potable Water Consumption	Reduce water consumption intensity, relative to the baseline of 27.3 million gallons, which equates to 26.3 gal/gsf through life-cycle cost-effective measures by 2 percent annually through FY2020 or 26 percent by the end of FY2020 using a baseline of FY2007 water consumption. (E.O. 13514)	26.3 gal/gsf	22.61 gal/gsf  (14%)		2.71 gal/gsf  (58.8%)
Greenhouse Gas Air Emissions					

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
Greenhouse Gases	Reduce Scope 1 and 2 GHG emissions attributed to facility use through life-cycle cost-effective measures by 28% by FY2020, relative to a FY2008 baseline (59,751,816 lbs. CO <sub>2</sub> e). (E.O. 13514)	59,751,816 lbs. CO <sub>2</sub> e	49,398,971 lbs. CO <sub>2</sub> e  19% reduction	14,236,712.49 lb. CO <sub>2</sub> e  4.7%		
	Reduce Scope 3 GHG emissions by 13% by FY2020, relative to a FY2008 baseline. (E.O. 13514)	14,302,252 lbs. CO <sub>2</sub> e (6,487.4 MT)	13,587,139 lbs. CO <sub>2</sub> e (6,021.95 MT)  (5.0%)	Scope 3 emissions are calculated on an annual basis only. Therefore, this number can only be reported once per year.		
GHG Emission Reporting	Report comprehensive GHG emission inventory for FY2010 by January 5, 2011, and annually thereafter by the end of January. (E.O. 13514)		Report emission inventories on a quarterly basis for year-end (FY) wrap up by January 31, 2016.	To be completed by January 2016.		
Scope 3 Emissions	Annually monitor and track Scope 3 GHG emissions associated with employee commuting and required travel and training. (E.O. 13514)		Emphasize employee ridesharing through NETL’s green transportation pool, Plugged-In articles, and Post-Its.	NETL is reducing travel for training and conferences to reduce greenhouse gas emissions.		
Green Purchasing						
Environmentally Preferred Products	Maximize site use of EPPs in operation and maintenance, janitorial, and general office activities. (E.O. 13514)  Purchase products that are recycled, bio-preferred, Energy Star, FEMP-designated, EPEAT, Water Sense, or otherwise water efficient. (E.O. 13423)		Ensure that 95% of new contract actions for products and services are: energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives.			

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter				
Environmental Management Plan	Objective/Target		Baseline	Target
			70% of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's Green Purchasing Standards.	
	Acquire uncoated printing and writing paper containing at least 30% post-consumer fiber. Reduce printing paper use. (E.O. 13514)		98% of copier and printer paper shall contain a minimum of 30% recycled post-consumer fiber by September 30, 2015.	
<b>Pest and Other Landscaping Management</b>				
<b>Pest and Other Landscaping Management</b>	Reduce the deer population at the PGH and MGN sites so that they can be maintained at a sustainable level per the wildlife management plan. (NETL—Deer Population Problem)  Implement pest management and other landscaping management practices. (E.O. 13514)		Implement the Wildlife Management Plan.  (5 deer for MGN, 2 deer for PGH)	Expecting submittal of the MGN deer survey (held Nov 18-20, 2014) from USDA-WV. A determination of culling for MGN and PGH as well as dates for the spring 2015 surveys will be made with the USDA-WV and USDA-PA.
<b>Workplace Health and Safety</b>				
<b>Non-Nationally Recognized Testing Laboratory Listed Equipment</b>	To systematically inspect all non-NRTL listed equipment to either receive authority having jurisdiction (AHJ) approval or reject as unsafe and remove from use.		Implement the non-NRTL listed equipment inspection/acceptance program by inspecting 275 pieces annually to ultimately accept or reject and subsequently remove from the non-NRTL listed equipment list.	39 pieces inspected

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
Naturally Occurring Radioactive Materials (NORM)	To survey, manage, and control NORM/TE-NORM that is in use or part of ORD R&D operations to ensure the safety of individuals performing the research, control the areas/methods of use, and allow for proper disposal of wastes associated with the use of NORM or TE-NORM.			Perform radiological surveys using appropriate equipment to complete/verify surveys of materials/samples associated with R&D SARS packages that use or are suspected to contain NORM/TE-NORM (i.e., geologic samples, zirconia crucibles, etc.).		ESS&HD continued with surveys of identified and suspected NORM/TE-NORM at all three NETL sites (~75% complete).
	Incorporate proper controls, precautions, and warnings into procedures and R&D SARS packages to ensure appropriate controls are maintained to prevent possible exposure scenarios.			Update radiological control procedures to implement appropriate NORM/TE-NORM controls and update radiological control requirements of R&D SARS packages associated with NORM/TE-NORM.		ESS&HD is working with SMEs to have the radiation control procedures updated during 2Q FY2015, with the DRAFT due on 3/31/2015.
				Ensure NORM/TE-NORM inventory is appropriately tracked via an approved tracking system (as of yet to be provided by NETL).		Tracking system purchase in-process via ITOMS site support contract (no firm ECD).
Equipment Specific Lockout/Tag out Procedures	To systematically complete all procedures and to have readily available for use.			Complete the equipment specific LOTO procedures for 200 pieces of equipment annually.		No procedures for any equipment were completed this quarter.
Groundwater Legacy Issues						
Remediate Groundwater	Prevent and mediate health, environmental, and regulatory impacts of groundwater contamination at the Albany site.			Make progress towards completion of the RI/FS scoping plan outline by 1/31/2016. Also implement actions to fill in missing information in the RI/FS scoping plan beginning on 7/1/15.		Completed update to the site conceptual model pending management decision to send to ODEQ.

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter					
Environmental Management Plan		Objective/Target	Baseline	Target	Actual
			Review the conceptual site model and the groundwater monitoring plan annually, which includes development of contaminant trend maps.	Continue the updates to the conceptual site model and final groundwater monitoring plan.	
			Complete two sampling events per year in the spring (wet season) and late summer/early fall (dry season).	Dry season sampling completed in August 2014. Wet Season sampling is scheduled for March 2015.	
			Maintain current knowledge of contaminants in the groundwater and changes in time.	Knowledge base is current through 2014.	
Infrastructure Safety					
Electrical Safety	Identify all electrical arc flash infrastructure issues, develop plans to address these issues, and eliminate the issues by FY2015.		Continue construction for two of the five projects and procure contractors for the other three of the five projects between the Albany, Morgantown, and Pittsburgh sites that will address the electrical arc flash issues.	The Albany project has been completed.  The Pittsburgh project is approximately 30% complete.  The Morgantown project has not been started yet.	

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
Life Safety Code Issues	Programmatically and systematically bring the Albany site into life safety code compliance.			Mitigate all hazards to an acceptable level through whatever means required (word order, minor project, GPP project, or placed on hold due to budgetary constraints) to ensure the safety of all NETL employees and visitors prior to September 2015 as a temporary fix.  The three Facility Fire Protection Appraisal (FFPA) plans for each site will be used to document/prioritize future actions.		Number of known issues mitigated:  Number of FFPA findings completed via work order:  Number of FFPA findings completed via minor project:  Number of FFPA findings completed via GPP:  Number of FFPA findings put on hold:
On-Site Construction Activities						
On-Site Construction Activities	Continually evaluate and improve ES&H performance related to on-site construction activities to minimize work stoppages, accident/injury/illness reporting, OSHA violations, and reporting to external agencies.			Track inspections, reviews, and activity hazard analyses (AHAs) of on-site construction activities: daily, weekly, and monthly inspections; Safety Analysis and Review System (SARS) activities associated with construction; and ESS&H reviews of construction projects; with goals set based on previous performance/project workload.		Inspections = 541
				Identify potential problems and their resulting preventive actions, mitigations, contracting officer action, or need to report to external regulatory agencies.		AHAs = 45  ES&H Plans = 4

Table 2.4.3: FY2015 Environmental Management Plan Metrics—First Quarter						
Environmental Management Plan		Objective/Target		Baseline	Target	Actual
				Minimize the number of work stoppages (either temporary or stop-work) annually, or the number of reports to external regulatory agencies (less than or equal to 1 per site per quarter).		Reports = Zero (0)

Table 3.13.1: 2014 Summary of Permits

Permit No. and Name	Site	Issue Date, Exp. Date	Regulatory Agency	Description
8731-02 Industrial Wastewater Discharge Permit	Albany	12/15/2014, 12/14/2018	City of Albany Public Works Department	Authorization to discharge industrial wastewater to the City of Albany sewer system.
G2140 Site Use Permit	Albany	03/01/2014, 02/28/2016	State of Washington— Department of Public Health	Site use permit to allow for low-level radioactive waste disposal at the regional disposal facility.
MUB 012 Industrial Waste Discharge Permit	Morgantown	02/17/2011, 02/16/2016	Morgantown Utility Board (MUB)	Permit allows for the operation of wastewater pretreatment facilities and discharge into MUB's sanitary sewer system. It sets discharge limits and monitoring requirements, compliance with the Morgantown Industrial Waste Ordinance, reporting requirements including accidental discharge reporting, and testing procedures.
WV0111457 WV/NPDES General Water Pollution Control Permit	Morgantown	03/03/2014, 02/28/2019	WVDEP, Division of Water and Waste Management	Approval for storm water activity with Registration No. WVG610042 and authorization to operate under WV/NPDES Permit No. WV0111457. Permit covers storm water associated with industrial activity. It identifies activities covered by the permit and the associated monitoring and analysis requirements for each. Also discussed are the Storm Water Pollution Prevention Plan and Groundwater Protection Management Plan required by the permit.
0296 Minor Source Operating Permit	Pittsburgh	01/06/2009, 01/05/2014; NETL submitted the renewal permit application on June 27, 2013 and additional information on July 23, 2013, permit renewal not yet issued.	Allegheny County Health Department, Air Quality Program	NETL-PGH is a minor source for particulate matter (PM), particulate matter of 10 microns or less in diameter (PM10), sulfur dioxide (SO <sub>2</sub> ), volatile organic compounds (VOCs), nitrogen oxides (NOX), carbon monoxide (CO) and Hazardous Air Pollutants (HAPs), as defined in section 2101.20 of Article XXI Air Pollution Control of the Allegheny County Health Department Rules and Regulations.
GF 47497.009 Industrial Sewer Use Permit	Pittsburgh	03/27/2013, 03/27/2014; 12/17/2014, 12/17/2019	Pleasant Hills Authority	Establishes permission for the discharge of certain industrial wastewaters for the purpose of treatment. Includes permit requirements, general provisions, fees, reporting, and local limits for certain discharge parameters.

Table 3.13.1: 2014 Summary of Permits

Permit No. and Name	Site	Issue Date, Exp. Date	Regulatory Agency	Description
PA0025844 Storm Water Discharge	Pittsburgh	07/11/01 A renewal application was submitted 01/10/01, but a new permit has not yet been issued. A permit transfer application for transfer of this permit to CDC/NIOSH (main Pittsburgh site tenant) was submitted on 10/22/14.	PADEP	NPDES permit for the discharge of site storm water into the public waterways of Pennsylvania.
02-81183008A Aboveground Storage Tank Registration Permit/Certificate	Pittsburgh	1990s, 10/04/2015	PADEP Bureau of Environmental Cleanup and Brownfields	Permit for above ground storage tank containing ferric chloride.
02-81183009A Aboveground Storage Tank Registration Permit/Certificate	Pittsburgh	1990s, 10/04/2015	PADEP Bureau of Environmental Cleanup and Brownfields	Permit for above ground storage tank containing caustic soda.
S-1018 Certificate of Fire and Explosion Safety	Pittsburgh	05/18/2004, None	Allegheny County Fire Marshal	Approval for the storage and handling of flammable and/or combustible liquids in above ground storage tank. Covers Ethanol Tank and Pump.
S-1102 Certificate of Fire and Explosion Safety	Pittsburgh	10/06/2006, None	Allegheny County Fire Marshal	Approval for the storage and handling of flammable and/or combustible liquids in above ground storage tank. Covers 1 diesel and 1 gasoline tank.

Table 5.7.1: June 2014 Data for "A" Aquifer—Morgantown

Parameter	UNITS	Sample Location									
		A	B	GAS-4	I	J	L	M	N	SP1-A	SP4-A
pH (field)	S.U.	5.92	6.58	5.45	6.76	6.02	5.61	5.21	4.56	6.05	4.15
Specific Conductance (field)	ohms	297	246	362	313	1219	1768	1141	1546	402	310
Temperature (field)	deg. C	15.3	15.6	15.1	15.7	13.9	13.8	13.5	14.0	15.1	15.2
Cadmium	ug/L	NT	NT	NT	ND	1.4	1.9	1.3	2.7	NT	NT

Table 5.7.2: June 2014 Data for "B-C" Aquifer—Morgantown

Parameter	UNITS	Sample Location				
		11	31	32-A	GAS-5	SP2-BC
pH (field)	S.U.	5.75	5.46	5.19	6.50	4.19
Specific Conductance (field)	ohms	196	683	4089	1676	409
Temperature (field)	deg. C	14.9	15.7	14.2	13.5	14.1

Table 5.7.3: June 2014 Data for Morgantown Aquifer				
Parameter	UNITS	Sample Location		
		D1-M	D2-M	D4-M
pH (field)	S.U.	6.42	8.74	6.43
Specific Conductance (field)	ohms	452	509	568
Temperature (field)	deg. C	15.6	13.1	15.9

Table 5.7.4: Oct. 2014 Data for "A" Aquifer—Morgantown											
Parameter	UNITS	Sample Location									
		A	B	GAS-4	I	J	L	M	N	SP1-A	SP4-A
pH (field)	S.U.	5.83	6.03	5.43	6.35	5.42	5.28	4.12	4.26	5.73	5.86
Specific Conductance (field)	ohms	348	254	378	371	1259	1779	1385	1623	493	332
Temperature (field)	deg. C	14.9	15.2	15.6	15.4	14.8	14.5	17.7	14.6	14.1	15.3
Cadmium	ug/L	NT	NT	NT	ND	1.5	1.7	1.7	2.6	NT	NT

Table 5.7.5: Oct. 2014 Data for "B-C" Aquifer—Morgantown							
Parameter	UNITS	Sample Location					
		11	31	32-A	GAS-5	SP2-BC	
pH (field)	S.U.	5.98	5.56	5.40	6.06	6.20	
Specific Conductance (field)	ohms	200	719	3750	1349	462	
Temperature (field)	deg. C	14.4	16.9	19.3	16.9	14.7	

Table 5.7.6: Oct. 2014 Data for Morgantown Aquifer				
Parameter	UNITS	Sample Location		
		D1-M	D2-M	D4-M
pH (field)	S.U.	NS	8.94	7.14
Specific Conductance (field)	ohms	NS	511	548
Temperature (field)	deg. C	NS	15.5	17.1

ND = not detected NT = not tested

Table 8.7.1: 2014 Groundwater Detection Monitoring Program: Results of Analysis – Groundwater Samples, Main Plateau – VOC Constituents (µg/L) – Pittsburgh					
Constituent	Well Number, Sample Date				
	MPW-7	MPW-8	MPW-9	MPW-10	MPW-11
	10/23/14	10/22/14	10/23/14	10/23/14	10/23/14
Acetone	NS	ND	NS	ND	ND
Benzene	NS	ND	NS	ND	ND
Bromodichloromethane	NS	ND	NS	ND	ND
Bromoform	NS	ND	NS	ND	ND
Bromomethane	NS	ND	NS	ND	ND
2-Butanone (MEK)	NS	ND	NS	ND	ND
Carbon Disulfide	NS	ND	NS	ND	ND
Carbon Tetrachloride	NS	ND	NS	ND	ND
Chlorobenzene	NS	ND	NS	ND	ND
Chloroethane	NS	ND	NS	ND	ND
Chloroform	NS	ND	NS	ND	1.7
Chloromethane	NS	ND	NS	ND	ND
Cyclohexane	NS	ND	NS	ND	ND
Dibromochloromethane	NS	ND	NS	ND	ND
1,2-Dibromo-3-chloropropane	NS	ND	NS	ND	ND
1,2-Dibromoethane (EDB)	NS	ND	NS	ND	ND
1,3-Dichlorobenzene	NS	ND	NS	ND	ND
1,4-Dichlorobenzene	NS	ND	NS	ND	ND
1,2-Dichlorobenzene	NS	ND	NS	ND	ND
Dichlorodifluoromethane	NS	ND	NS	ND	ND
1,1-Dichloroethane	NS	9.1	NS	ND	ND
1,2-Dichloroethane	NS	ND	NS	ND	ND
1,1-Dichloroethene	NS	ND	NS	ND	ND
Cis-1,2-Dichloroethene	NS	ND	NS	ND	ND
Trans-1,2-Dichloroethene	NS	ND	NS	ND	ND
1,2-Dichloropropane	NS	ND	NS	ND	ND
Cis-1,3-Dichloropropene	NS	ND	NS	ND	ND
Trans-1,3-Dichloropropene	NS	ND	NS	ND	ND
Ethylbenzene	NS	ND	NS	ND	ND
2-Hexanone	NS	ND	NS	ND	ND
Isopropylbenzene	NS	ND	NS	ND	ND
Methyl acetate	NS	ND	NS	ND	ND
Methylene chloride	NS	ND	NS	ND	ND
Methylcyclohexane	NS	ND	NS	ND	ND
4-Methyl-2-pentanone (MIBK)	NS	ND	NS	ND	ND
Methyl tert-butyl ether	NS	ND	NS	ND	ND
Styrene	NS	ND	NS	ND	ND
1,1,2,2-Tetrachloroethane	NS	ND	NS	ND	ND
1,2,4-Trichlorobenzene	NS	ND	NS	ND	ND
Tetrachloroethene (PCE)	NS	ND	NS	ND	ND
1,1,1-Trichloroethane	NS	ND	NS	ND	ND
1,1,2-Trichloroethane	NS	ND	NS	ND	ND
Trichloroethene (TCE)	NS	ND	NS	ND	ND
Trichlorofluoromethane	NS	ND	NS	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	ND	NS	ND	ND
Toulene	NS	ND	NS	ND	ND
Vinyl chloride	NS	ND	NS	ND	ND
Xylenes (total)	NS	ND	NS	ND	ND

ND = not detected NS = not sampled

Exceeded EPA Region III Risk Based Table

Table 8.7.2: 2014 Groundwater Detection Monitoring Program: Results of Analysis – Groundwater Samples, Valley Filled – VOC Constituents (µg/L) – Pittsburgh					
Constituent	Well Number, Sample Date				
	VFW-2	VFW-2-I	VFW-3	VFW-10	VFW-14
	10/21/14	10/21/14	10/22/14	10/20/14	10/20/14
Acetone	NS	NS	ND	NS	NS
Benzene	NS	NS	ND	NS	NS
Bromodichloromethane	NS	NS	ND	NS	NS
Bromoform	NS	NS	ND	NS	NS
Bromomethane	NS	NS	ND	NS	NS
2-Butanone	NS	NS	ND	NS	NS
Carbon Disulfide	NS	NS	ND	NS	NS
Carbon Tetrachloride	NS	NS	ND	NS	NS
Chlorobenzene	NS	NS	ND	NS	NS
Chloroethane	NS	NS	ND	NS	NS
Chloroform	NS	NS	ND	NS	NS
Chloromethane	NS	NS	ND	NS	NS
Cyclohexane	NS	NS	ND	NS	NS
Dibromochloromethane	NS	NS	ND	NS	NS
1,2-Dibromo-3-chloropropane	NS	NS	ND	NS	NS
1,2-Dibromoethane	NS	NS	ND	NS	NS
1,3-Dichlorobenzene	NS	NS	ND	NS	NS
1,4-Dichlorobenzene	NS	NS	ND	NS	NS
1,2-Dichlorobenzene	NS	NS	ND	NS	NS
Dichlorodifluoromethane	NS	NS	ND	NS	NS
1,1-Dichloroethane	NS	NS	ND	NS	NS
1,2-Dichloroethane	NS	NS	ND	NS	NS
1,1-Dichloroethene	NS	NS	ND	NS	NS
Cis-1,2-Dichloroethene	NS	NS	4.8	NS	NS
Trans-1,2-Dichloroethene	NS	NS	ND	NS	NS
1,2-Dichloropropane	NS	NS	ND	NS	NS
Cis-1,3-Dichloropropene	NS	NS	ND	NS	NS
Trans-1,3-Dichloropropene	NS	NS	ND	NS	NS
Ethylbenzene	NS	NS	ND	NS	NS
2-Hexanone	NS	NS	ND	NS	NS
Isopropylbenzene	NS	NS	ND	NS	NS
Methyl acetate	NS	NS	ND	NS	NS
Methylene chloride	NS	NS	ND	NS	NS
Methylcyclohexane	NS	NS	ND	NS	NS
4-Methyl-2-pentanone	NS	NS	ND	NS	NS
Methyl tert-butyl ether	NS	NS	ND	NS	NS
Styrene	NS	NS	ND	NS	NS
1,1,2,2-Tetrachloroethane	NS	NS	ND	NS	NS
1,2,4-Trichlorobenzene	NS	NS	6.2	NS	NS
Tetrachloroethene (PCE)	NS	NS	12	NS	NS
1,1,1-Trichloroethane	NS	NS	ND	NS	NS
1,1,2-Trichloroethane	NS	NS	ND	NS	NS
Trichloroethene (TCE)	NS	NS	ND	NS	NS
Trichlorofluoromethane	NS	NS	ND	NS	NS
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	ND	NS	NS
Toulene	NS	NS	ND	NS	NS
Vinyl chloride	NS	NS	ND	NS	NS
Xylenes (total)	NS	NS	ND	NS	NS

ND = not detected    NS = not sampled

	Exceeded Pennsylvania Primary Drinking Water MCL and EPA Region III Risk Based Table
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Table 8.7.4: 2014 Groundwater Detection Monitoring Program: Results of Analysis – Groundwater Samples Valley Fill – TPH Constituents (mg/L) – Pittsburgh										
Constituent	Well Number, Sample Date									
	VFW-2		VFW-2-I		VFW-4		VFW-7		VFW-9	
	05/22/14	10/21/14	05/22/14	10/21/14	5/22/14	10/20/14	05/23/14	10/21/14	05/22/14	10/22/14
TPH-DRO	0.064	0.200	0.073	0.200	0.065	0.150	0.083	0.180	0.120	0.110
Constituent	Well Number, Sample Date									
	VFW-10		VFW-10-I		VFW-11		VFW-12		VFW-14	
	05/23/14	10/20/14	05/23/14	05/23/14	05/22/14	10/20/14	05/22/14	10/22/14	05/23/14	10/20/14
TPH-DRO	0.007	0.160	NS	NS	0.083	0.160	0.230	0.220	0.078	0.230

ND = not detected; NS = not sampled; TPH-DRO = total petroleum hydrocarbons - diesel range organics;  
NS=not sampled

**Table 8.7.5: 2014 Groundwater Detection Monitoring Program:  
Results of Analysis – Groundwater Samples, Main Plateau –  
Groundwater Characteristics Constituents – Pittsburgh**

Constituent	Well Number, Sample Date								
	MPW-2	MPW-4	MPW-4-1	MPW-4D	MPW-7	MPW-8	MPW-9	MPW-10	MPW-11
	10/23/14	10/22/14	10/22/14	10/22/14	10/23/14	10/22/14	10/23/14	10/23/14	10/23/14
<b>Inorganics (ug/l)</b>									
Aluminum	5,400	380	380	NS	6,600	190	ND	ND	420
Boron	39	74	74	NS	88	44	120	150	110
Calcium	570,000	170,000	170,000	NS	230,000	570,000	45,000	3,200	350,000
Iron	51,000	3,900	3,900	NS	15,000	6,800	7,800	30	1,400
Magnesium	110,000	58,000	58,000	NS	31,000	98,000	12,000	580	81,000
Manganese	3,600	170	170	NS	290	340	140	6.2	520
Nickel	87	69	69	NS	550	270	300	0.73	26
Potassium	5,100	3,000	3,000	NS	5,400	7,400	1,200	440	6,900
Silica	20,000	12,000	12,000	NS	28,000	8,700	8,800	8,600	7,900
Sodium	430,000	170,000	170,000	NS	370,000	890,000	220,000	270,000	720,000
Strontium	1,000	540	540	NS	420	1,100	2,000	160	950
<b>Quality Parameters (mg/L)</b>									
Chloride	2,000	290	290	NS	850	2,800	250	190	1,700
Fluoride	ND	0.11	0.11	NS	0.19	0.17	0.15	0.42	0.16
Nitrate	0.098	0.28	0.28	NS	1.4	0.084	0.081	ND	2.8
Sulfate	110	67	67	NS	210	260	16	42	240
Total Dissolved Solids	3,800	770	770	NS	2,100	5,500	650	610	3,600
Total Alkalinity	ND	ND	ND	NS	230	ND	ND	ND	ND

ND = not detected    NS= not sampled

	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table, Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table
	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level

**Table 8.7.6: 2014 Groundwater Detection Monitoring Program:  
Results of Analysis – Groundwater Samples, Valley Filled – Groundwater Characteristics Constituents – Pittsburgh**

Constituent	Well Number, Sample Date												
	VFW-1	VFW-2	VFW-2-1	VFW-3	VFW-4	VFW-5	VFW-6	VFW-7	VFW-9	VFW-10	VFW-11	VFW-12	VFW-14
	10/21/14	10/21/14	10/21/14	10/22/14	10/20/14	10/20/14	10/20/14	10/21/14	10/22/14	10/20/12	10/20/14	10/22/14	10/20/14
<b>Inorganics (ug/l)</b>													
Aluminum	ND	ND	ND	8,000	ND	ND	560	ND	6,700	ND	ND	580	ND
Boron	260	190	190	58	65	180	290	75	40	94	56	410	170
Calcium	6,200	330,000	330,000	300,000	360,000	320,000	240,000	650,000	30,000	340,000	310,000	260,000	820,000
Iron	56	3,400	3,400	17,000	15,000	4,500	2,100	6,600	16,000	2,100	2,600	3,900	16,000
Magnesium	1,600	67,000	67,000	120,000	110,000	51,000	28,000	150,000	6,900	61,000	74,000	71,000	170,000
Manganese	11	1,400	1,400	1,500	280	34	250	1,600	180	2,700	660	150	12,000
Nickel	1.6	3.2	3.2	320	830	49	6.4	4.6	88	52	200	500	7.9
Potassium	1,000	4,900	4,900	7,900	4,100	5,000	20,000	6,500	3,100	13,000	2,400	4,700	6,900
Silica	11,000	20,000	20,000	30,000	14,000	17,000	15,000	13,000	22,000	14,000	9,200	14,000	16,000
Sodium	240,000	450,000	450,000	310,000	45,000	380,000	1,100,000	710,000	64,000	730,000	110,000	270,000	1,000,000
Strontium	700	3,000	3,000	1,400	2,700	900	1,100	7,800	76	830	720	1,900	2,900
<b>Quality Parameters (mg/L)</b>													
Chloride	18	740	740	1,200	800	970	1,700	2,400	120	1,600	660	580	2,900
Fluoride	1.2	1.1	1.1	0.13	0.12	0.41	0.64	0.16	0.16	0.36	0.086	0.35	0.23
Nitrate	ND	ND	ND	1.5	0.060	0.32	4.5	0.034	1.6	0.32	0.065	0.36	0.070
Sulfate	0.58	760	760	130	84	200	410	170	44	400	170	380	250
Total Dissolved Solids	520	4,000	4,000	2,600	2,000	2,300	3,600	5,000	330	3,200	1,800	1,800	6,000
Alkalinity	530	280	280	290	330	250	88	240	98	280	240	320	280

ND = not detected

	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table, Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table
	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level

**Table 8.7.7: 2014 Groundwater Detection Monitoring Program:  
Results of Analysis – Groundwater Samples, Main Plateau – Contamination  
Indicator Constituents – Pittsburgh**

Constituent	Well Number, Sample Date								
	MPW-1	MPW-2	MPW-4	MPW-4-1	MPW-7	MPW-8	MPW-9	MPW-10	MPW-11
	10/21/14	10/23/14	10/22/14	10/22/14	10/23/14	10/22/14	10/23/14	10/23/14	10/23/14
pH (standard units)	7.29	6.56	6.88	6.88	6.82	6.67	7.45	8.76	7.06
Specific Conductance (ms/cm)	6.965	7.111	2.295	2.295	2.895	8.196	1.294	1.211	4.871
Temperature (°C)	14.27	12.54	13.53	13.53	13.95	15.92	10.95	13.01	15.66
TOX (mg/L)	NS	0.190	0.049	0.049	0.150	0.180	0.057	0.068	0.120
TOC (mg/L)	NS	5.2	2.1	2.1	1.6	0.51	0.61	0.69	0.97

TOX = total organic halogens; TOC = total organic carbon; specific conductance unit = ms/cm @ 25 °C;

NS= not sampled

Exceeded Pennsylvania Secondary Drinking Water MCL
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**Table 8.7.8: 2014 Groundwater Detection Monitoring Program:  
Results of Analysis – Groundwater Samples, Valley Fill – Contamination Indicator Constituents – Pittsburgh**

Constituent	Well Number, Sample Date												
	VFW-1		VFW-2		VFW-2-1	VFW-3		VFW-4		VFW-5		VFW-6	
	05/22/14	10/21/14	05/22/14	10/21/14	05/22/14	05/22/14	10/22/14	05/22/14	10/20/14	05/22/14	10/20/14	05/22/14	10/20/14
pH (standard units)	NS	7.94	6.76	7.02	6.76	NS	6.78	6.99	6.74	NS	6.93	NS	7.91
Spec. Conductance (ms/cm)	NS	0.910	7.132	3.965	7.132	NS	4.123	2.590	3.390	NS	3.750	NS	6.023
Temperature (°C)	NS	12.72	12.96	13.88	12.96	NS	14.05	16.88	16.49	NS	13.71	NS	14.08
TOX (mg/L)	NS	0.020	NS	0.074	NS	NS	0.120	NS	0.062	NS	0.069	NS	0.150
TOC (mg/L)	NS	0.79	NS	1.5	NS	NS	1.5	NS	0.59	NS	1.4	NS	2.5
	VFW-7		VFW-9		VFW-10		VFW-11		VFW-12		VFW-14		
	05/22/14	10/21/14	05/22/14	10/22/14	05/22/14	10/20/14	05/22/14	10/20/14	05/22/14	10/22/14	05/23/14	10/20/14	
pH (standard units)	6.76	6.47	7.02	7.75	6.92	6.68	7.23	6.78	7.46	6.99	6.95	6.53	
Spec. Conductance (ms/cm)	6.921	6.398	2.063	0.619	4.136	4.799	2.069	2.433	2.862	2.944	4.254	9.180	
Temperature (°C)	13.65	12.23	10.90	12.11	11.57	13.47	13.33	12.84	13.24	12.52	12.01	13.90	
TOX (mg/L)	NS	0.088	NS	0.037	NS	0.150	NS	0.047	NS	0.062	NS	0.150	
TOC (mg/L)	NS	0.87	NS	1.2	NS	1.1	NS	1.1	NS	4.1	NS	1.6	

NS = not sampled    TOX = total or

**Table 9.8.1: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8	
	N/A	N/A	N/A	N/A	02/12	08/18	02/11	08/18	02/13	08/20	02/13	08/20	02/13	08/21	02/12	08/19
1,1,1,2-Tetrachloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	NS	NS	NS	NS	0.11	0.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NS	NS	NS	NS	0.38	0.63	ND	ND	ND	ND	ND	0.61	ND	ND	ND	ND
cis-1,3-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Table 9.8.1: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8	
	N/A	N/A	N/A	N/A	02/12	08/18	02/11	08/18	02/13	08/20	02/13	08/20	02/13	08/21	02/12	08/19
Toluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	NS	NS	NS	NS	0.31	0.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not detected

NS= Not Sampled

	Exceeds Groundwater Quality Standards
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**Table 9.8.2: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15		MW-16	
	02/14	08/19	02/14	08/19	02/14	08/21	N/A	N/A	02/11	08/18	2/12	08/18	2/12	08/19	02/13	08/21
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	NS	NS	ND	9.6	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	0.71	0.71	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	0.18	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	0.28	ND	21	12	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	6.2	3.2	8.4	6.0	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND

**Table 9.8.2: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15		MW-16	
	02/14	08/19	02/14	08/19	02/14	08/21	N/A	N/A	02/11	08/18	2/12	08/18	2/12	08/19	02/13	08/21
Toluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	0.29	ND	440	360	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not detected

NS= Not Sampled

	Exceeds Groundwater Quality Standards
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**Table 9.8.3: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-17		MW-18		MW-19		MW-20		MW-21		MW-22		MW-23		MW-24	
	02/12	08/18	02/11	08/19	02/14	08/19	02/14	08/19	N/A	N/A	02/13	08/19	02/14	08/18	02/14	08/21
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.19	11	7,300	790	ND	ND	1,800	1,400	NS	NS	72	54	5.3	4.5	28	30
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Chloroform	ND	2.5	880	93	ND	ND	170	160	NS	NS	9.3	6.1	1.6	1.5	5.9	6.5
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.24	ND	ND	ND	ND	ND	ND	ND	NS	NS	2.2	2.8	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	230	48	ND	ND	ND	ND	NS	NS	1.6	1.8	ND	ND	ND	0.15
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND

**Table 9.8.3: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-17		MW-18		MW-19		MW-20		MW-21		MW-22		MW-23		MW-24	
	02/12	08/18	02/11	08/19	02/14	08/19	02/14	08/19	N/A	N/A	02/13	08/19	02/14	08/18	02/14	08/21
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	0.39	0.43	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	21	580	460	110	ND	ND	310	200	NS	NS	13	13	7.3	5.6	36	38
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND

ND = Not detected

NS= Not Sampled

	Exceeds Groundwater Quality Standards
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**Table 9.8.4: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-25		MW-26		MW-27		MW-28		MW-29		MW-30		MW-31		MW-100	
	02/12	08/19	02/11	08/18	02/12	08/19	02/11	08/19	02/11	08/18	02/13	08/20	02/13	08/20	02/15	08/20
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	0.15	0.11	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	190	150	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	29	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0	7.7	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Table 9.8.4: NETL-Albany 2014 Groundwater Detection Monitoring Program:  
Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number, Sample Date															
	MW-25		MW-26		MW-27		MW-28		MW-29		MW-30		MW-31		MW-100	
	02/12	08/19	02/11	08/18	02/12	08/19	02/11	08/19	02/11	08/18	02/13	08/20	02/13	08/20	02/15	08/20
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	0.30	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.72	0.57	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34	0.36	ND	ND	11	28
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not detected

	Exceeds Groundwater Quality Standards
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Table 9.8.5: NETL-Albany 2014 Groundwater Detection Monitoring Program: Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)						
Constituent	Well Number and Sample Date					
	MW-101		MW-102		MW-103	
	02/15	08/20	02/15	08/20	02/15	08/20
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	0.27	0.35	ND	ND

**Table 9.8.6: NETL-Albany 2014 Groundwater Detection Monitoring Program: Results of Analysis—Groundwater Samples—VOC Constituents (µg/L)**

Constituent	Well Number and Sample Date					
	MW-101		MW-102		MW-103	
	02/15	08/20	02/15	08/20	02/15	08/20
Chlorobenzene	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	0.49	0.69	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	0.26	0.58	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	26	32	0.21	0.33
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND

ND = Not detected

Exceeds Groundwater Quality Standards

Table 9.8.7: NETL-Albany 2014 Groundwater Detection Monitoring Program: Results of Analysis—Groundwater Samples—Metals (mg/L)								
Constituent	Well Number, Sample Date							
	MW-3	MW-4	MW-6	MW-13	MW-14	MW-15	MW-16	MW-17
	8/18	8/18	8/20	8/18	8/18	8/19	8/21	8/18
Aluminum	ND	ND	0.17	0.12	ND	ND	ND	ND
Arsenic	ND	0.0020	ND	.0021	ND	0.0033	0.030	0.0014
Barium	0.0066	0.039	0.015	0.017	0.0027	0.094	0/036	0.0053
Calcium	26	36	15	18	15	880	41	52
Chromium	ND	ND	0.0023	ND	ND	ND	ND	ND
Cobalt	ND	ND	ND	ND	ND	0.0014	ND	ND
Iron	0.11	0.66	0.23	0.14	ND	0.11	19	ND
Magnesium	14	18	8.3	9.3	6.2	430	18	27
Manganese	0.0056	0.049	0.015	0.15	0.0027	0.13	1.1	0.025
Nickel	ND	ND	ND	ND	ND	0.0026	ND	ND
Potassium	1.1	1.7	ND	1.5	1.1	7.8	1.7	2.1
Sodium	10	19	9.4	7.7	9.2	120	17	36
Vanadium	0.0071	0.0058	0.0059	0.011	0.0069	0.0036	ND	0.0066

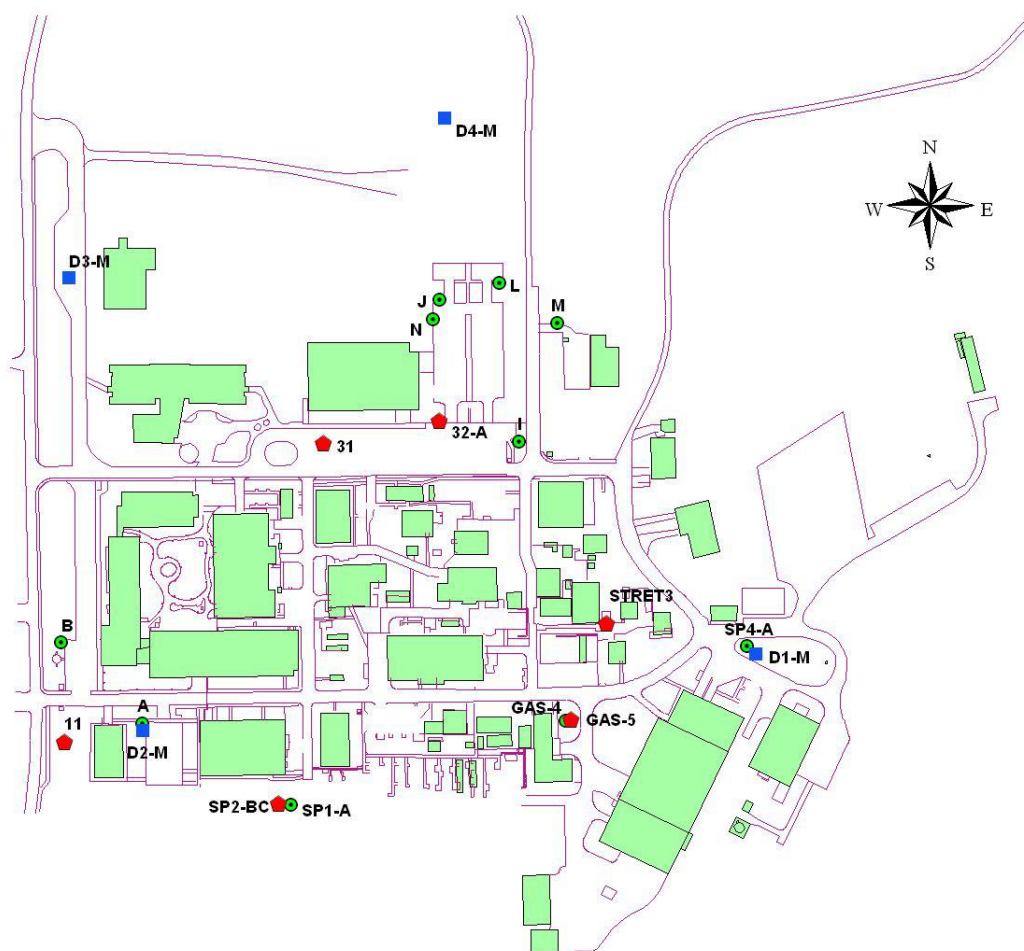
ND = Not Detected

	Exceeds Groundwater Quality Standards
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Table 9.8.8: NETL-Albany 2014 Groundwater Detection Monitoring Program: Results of Analysis— Groundwater Samples—Metals (mg/L)						
Constituent	Well Number, Sample Date					
	MW-18	MW-19	MW-20	MW-22	MW-23	MW-24
	8/19	8/19	8/19	8/19	8/18	8/21
Aluminum	0.79	ND	0.11	0.11	ND	0.18
Arsenic	ND	ND	0.0018	0.0018	0.0012	0.0012
Barium	0.0052	0.012	0.025	0.0096	0.0053	0.0072
Calcium	32	16	34	25	34	25
Chromium	ND	ND	ND	ND	ND	ND
Cobalt	ND	ND	0.0012	0.0017	ND	ND
Iron	ND	0.16	0.16	0.20	ND	0.43
Magnesium	16	8.3	16	12	19	15
Manganese	ND	0.69	2.5	0.32	ND	0.0059
Nickel	ND	ND	0.0028	ND	ND	ND
Potassium	ND	ND	1.1	1.4	1.3	1.4
Sodium	17	9.5	22	25	16	22
Vanadium	0.0099	ND	0.017	0.0045	0.010	0.011

ND = Not Detected

	Exceeds Groundwater Quality Standards
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**NETL Morgantown Site  
Active Groundwater Monitoring Wells**



Figure 5.7.1: Active Monitoring Wells at the Morgantown Site

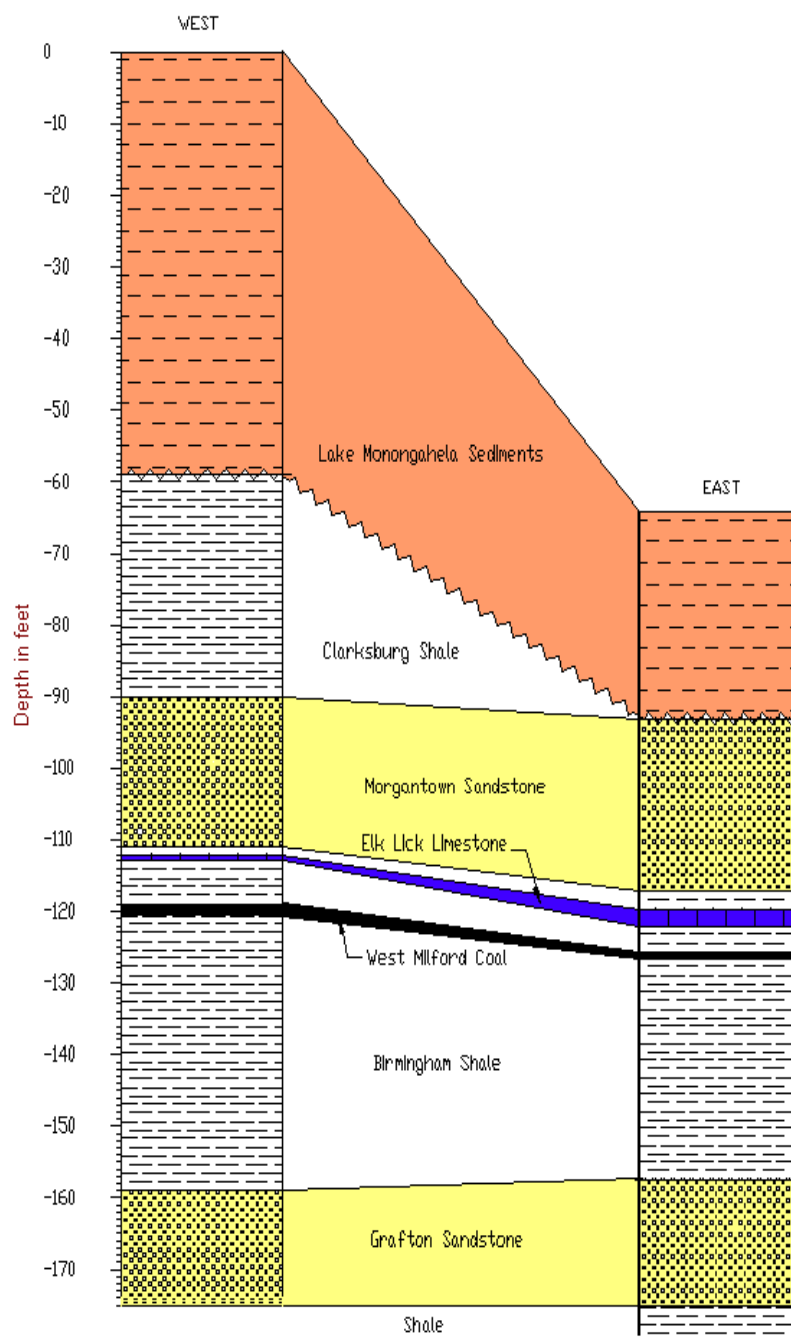


Figure 5.7.2: Generalized Cross-Section of Aquifer Units at the Morgantown Site

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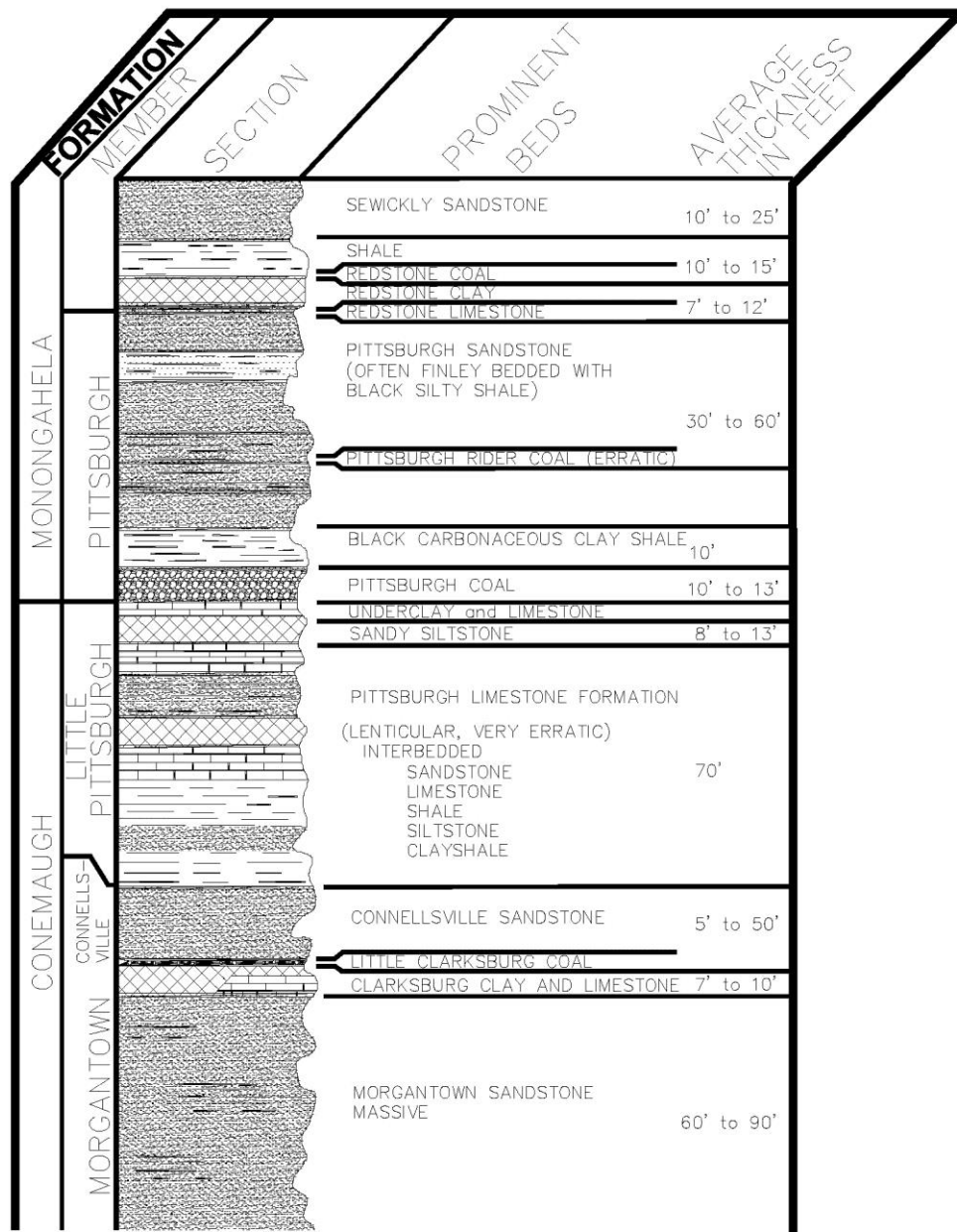


Figure 7.7.2: General Geologic Column—Pittsburgh

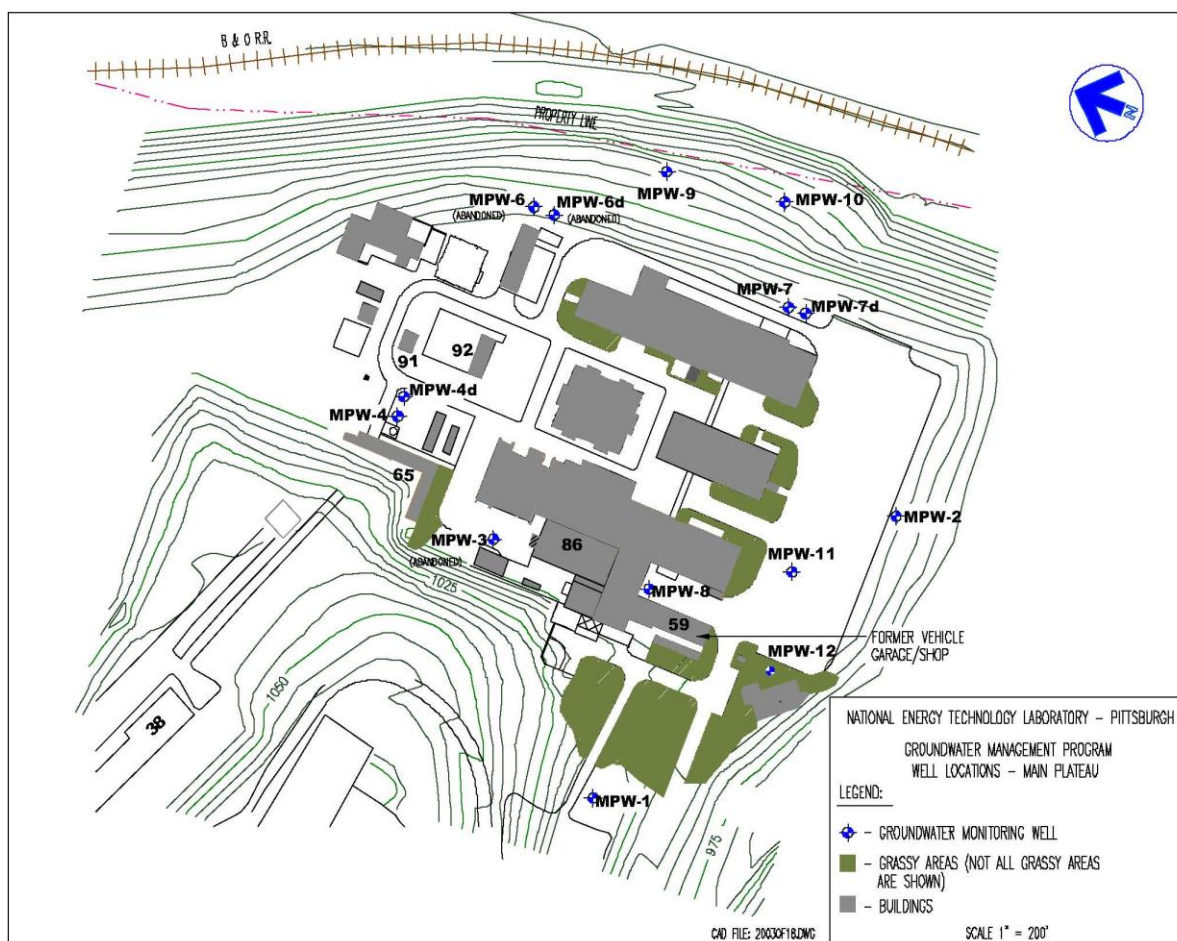


Figure 7.7.3: Groundwater Management Program  
R&D Plateau Well Locations—Pittsburgh

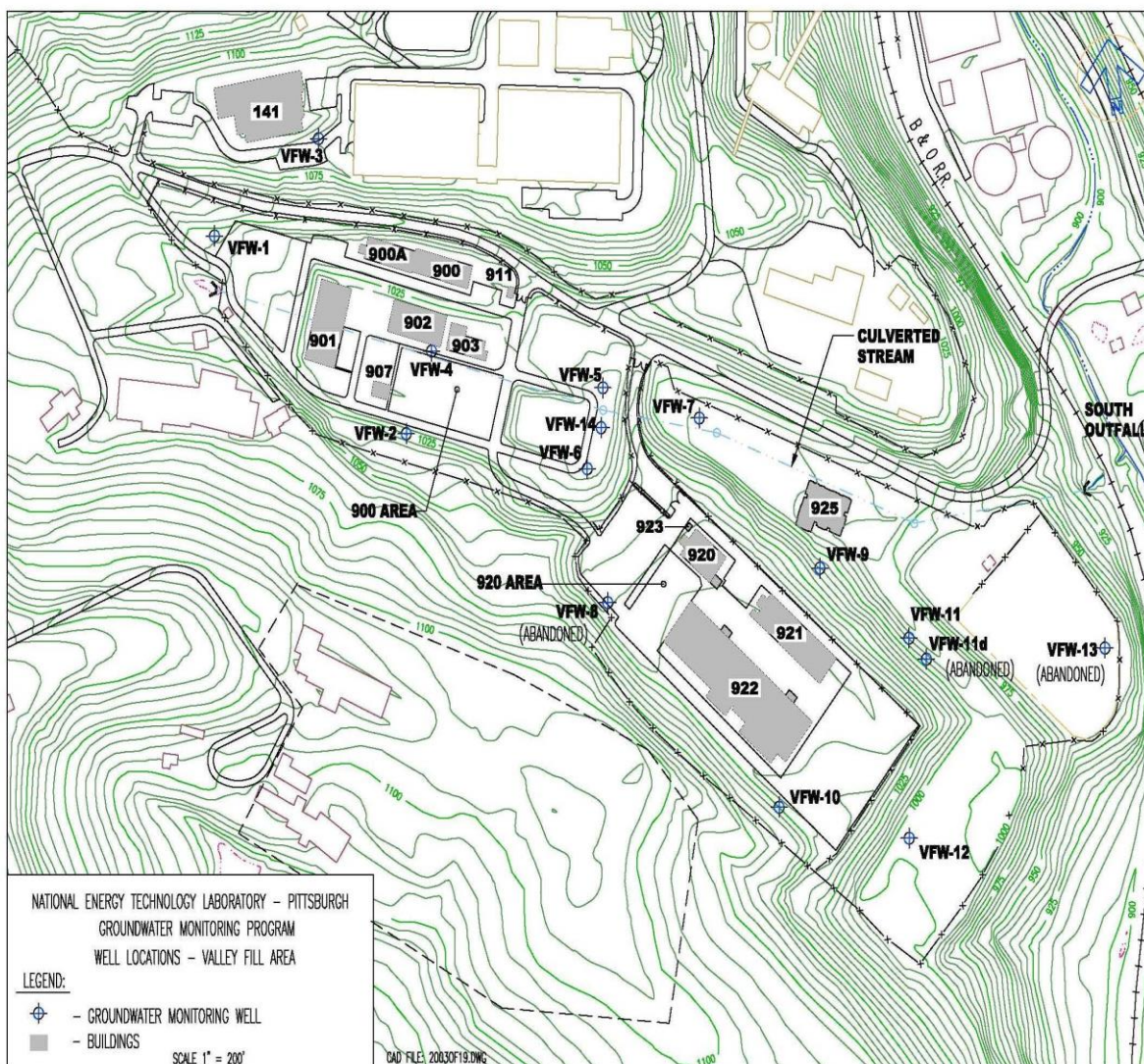


Figure 7.7.4: Groundwater Management Program  
Valley Fill Well Locations—Pittsburgh

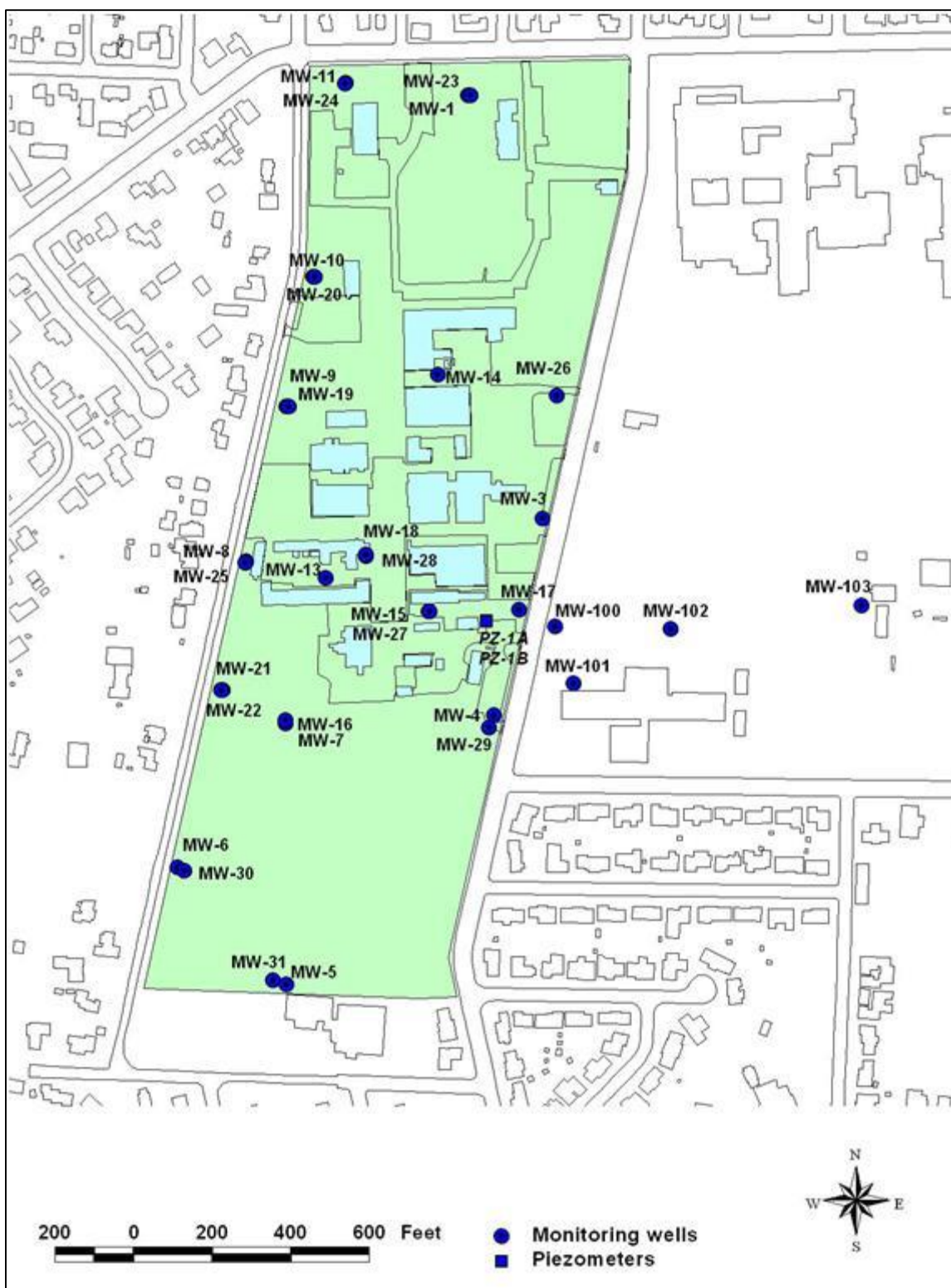


Figure 9.8.1: Monitoring Well Locations—Albany